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Smoke (Preventing, Burning, and Condensing. —A. M. Clark (com.), 1269.

Soap.—C. Thomas, W. J. Fuller, and S. A. King, 1282.

Sounds (Producing, &c.)—J. W. T. Cadett, 1531.

Spinning and Preparing for Spinning.—T. Doleman, 1289. R. Watson, 1302. P. M'Gregor, 1325. H. H. Lake (com.), 1329. B. A. Dobson, 1349. T. Mitchell, 1378. J. Holden, 1431. A. C. Hendersen (com.), 1457. J. Tatham, 1482. P. Poulin, 1512. R. Tatham, 1531. S. Mason and J. Conlong, 1554.

Spoons and Ladles.—H. Krupp, 1395.

Springs.—J. W. Wiliford, 1155. M. Prior, 1453.

Stables, &c.—J. Imray (com.), 1471.

Steam Boilers, &c.—J. E. Thomas, 1187. R. W. Lewis, 1287. E. Latham and F. Bradley, 1304. W. Eaves, 1308. H. J. Haddan (com.), 1323. W. Paulson, 1324. C. M. Jacobs and T. Hewitson, 1382. J. G. Hughes, 1399. H. Koettgen, 1413. G. Rowland and W. Varley, 1433. W. Watson, 1497. J. H. Johnson (com.), 1508.

Steam Engines.—H. Simon (com.), 1147. E. T. Hughes (com.), 1167. J. J. and T. Thewlis, 1260. E. C. Cassot, 1279. J. C. Chapman, 1356. J. Matthews, 1429. J. S. Stubbs, 1443. N. P. 1558.

Steam Traps.—S. Pitt (com.), 1525.

Steering or Guiding Ships and Boats.—J. B. Scott, 1247. R. B. Smith, 1292. J. I. Thornycroft, 1330. J. Eccleston, 1338.

Sugars, &c.—J. H. Johnson (com.), 1266. W. L. Wise (com.), 1444. M. Gill (com.), 1484.

Surgery.—J. Mayer, 1162.

Teaching.—P. Jensen (com.), 1138.

Telegraphs; Telegraph Printing Apparatus.—F. C. Glaser (com.), 1181. H. W. Hemsworth, 1229. E. A. Cowper, 1242. F. Wirth (com.), 1307. T. A. Dillon, 1347. J. Pitkin, 1383. H. J. Haddan (com.), 1477. J. W. T. Cadett, 1531.

Thermometers.—Clara Milton, 1246.

Tilling and Cultivating, &c.—T. Bradley, 1205. G. Reid, 1212. J. Imray (com.), 1262. W. Unterilp, 1201. G. W. Murray and A. and J. Macdonald, 1396.

Tobacco and Snuff, Cigars, Cigar-holders, Pipe and Cigar-lighters, Smoking-pipes, Tobacco-pouches.—E. de Pass (com.), 1177. J. J. Telfer, 1348. H. A. Bonneville (com.), 1504.

Tramways and Tramway Carriages, Tramway Locomotives.—J. Matthews, 1429.

Trimmings.—N. Vinall and G. Twentyman, 1313.

Tunnels.—M. Hahn, 1243.

Umbrellas, Parasols, &c.—W. Carter, 1346. J. Willis, 1369. T. J. Smith (com.), 1381.

Upholstery.—F. W. Brownlow (com.), 1218.

Valves, Taps, Stop Cocks, Plugs; Regulating the Flow and Pressure of Fluids.—H. Simon (com.), 1147. E. T. Hughes (com.), 1167. W. R. Lake (com.), 1176. R. Brewster, 1184. J. J. Royle, 1208. S. Whitaker, 1209. J. Farmer, 1232. J. T. Trotter, 1233. W. H. Pearson, 1240. J. M'Gannett, 1272. R. B. Smith, 1292. W. Eaves, 1308. B. Rhodes, 1334. G. W. Harvey and W. D. Seal, 1408. M. Prior, 1453. J. H. Johnson (com.), 1508. A. A. Joug, 1586. C. J. Waddell, 1553. N. P. Burgh, 1558.

Velocipedes, Bicycles.—E C. S. Otto, 1274. D. Campbell and J. Walker, 1305. P. P. Howard, 1386. G. B. Cooper, 1514.

Ventilation; Supplying and Purifying Air for Buildings, Mines, Ships, Carriages, &c.—J. M. Lamb, 1199. J. Nixon, 1295. B. Hunt (com.), 1312. J. Leigh and J. H. Gartside (com.), 1367. J B. Papier and T. Janeway, 1390. P. Jensen (com.), 1418. L. H. Hauber, 1458.

Waterclosets, &c.—G. H. Witrb, 1167. G. Wm. von Nawrocki (com.), 1201. J. B. Denton and J. C. Merryweather, 1238. H. W. Pearson, 1240. C. Kesseler (com.), 1276. J. Mackie, 1357.

Waterwheels and Engines, &c.—W. E. Gedge (com.), 1352.

Weaving, Braiding, Plaiting, Preparing for Weaving.—J. Vickerman, J. Whitehead, and J. Moorhouse, 1145. L. A. Groth (com.), 1152. J. Laing, W. Stancliffe, and J. Brierley, 1197. A. Topp, 1217. C. Hughes and W. H. Bairstow, 1252. H. T. Woodward and G. W. Grosvener, 1267. E. Weild, 1300. H. A. Bonneville (com.), 1310. G. Hindle, 1475. A. Hildebrandt (com.), 1490. A. Sowder, 1498. J. Webster, 1546.

Wheels for Carriages, &c.—E. Hora, 1230. D. Campbell and J. Walker, 1305. C. Cadle and A. M. Brown, 1355. A. M. Clark (com.), 1402. A. Squire, 1430.

Wheels for Machinery.—J. Imray (com.), 1262.

Window Blinds, &c.—F. W. Brownlow (com.), 1218.

Windows and Sashes, &c.—J. Gillings, 1297. C. B. Welin, 1312. K. Adams, 1520.

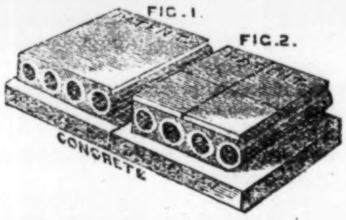
Wood and Veneers, &c.—P. P. de la Sala, 1552.

Zinc (Salts and Oxides).—T. Griffiths and J. Cawley, 1131.

⁂ *The above List is prepared from the Patent Records by Mr. T. Morgan, Secretary of the Inventors' Patentright Association, Limited.*

PRITCHETT'S PATENT FLOOR TILING.

This is a system of hollow tiling, which has been specially invented by Mr. Pritchett, of Bishop Stortford, for the cooling or heating of rooms that might be, however, very well adapted to the supply of air to the fire, especially in rooms the floors of which are tiled throughout. In such cases the air could be led direct from without from any particular and convenient aspect, and it would only be necessary to sink the hearth down the depth of the tiles in order to keep the supply-holes free from ashes. It can easily be imagined how these tiles could be adapted also to an ordinary fireplace when the floor was of wood, as the inlets of air for the support of combustion, if properly proportioned, would serve equally well were they placed in the wall between the hearth and the outer air—the holed inlets terminating underneath and at the back of the grate itself. Or these hollow tiles could be laid in the pugging or sound-boarding space, and be led to the fire from any exterior wall however distant—a square space being interposed—of the depth of the tile—when it became necessary to turn a corner.



It will of course be necessary to guard against conveying too much air to the fire, for a great loss of heating power occurs when more air is supplied than what is requisite to support proper combustion. With too roaring a fire and too lively a draught there is a great waste of fuel, especially when the chimney flue is a high one. The exact amount of inlet to a house-fire is more or less still a matter of experiment, but one thing is certain—the fire must be supplied from somewhere, and when it is specially supplied, the air in the room is the less vitiated. Moreover, if a fire be sufficiently supplied with air the fuel is wasted, inasmuch as less heat is given out.

A QUICKSILVER MOTOR.

A street car motor to be run by quicksilver is being manufactured at Aurora, Ill. About 800 pounds of quicksilver is to be placed in a reservoir at the top of the car and to pour down over a cast iron over-shot wheel, producing an equivalent of three-horse power, The quicksilver is to be returned to the reservoir by pumps placed underneath the car, to be operated by a brakeman by means of a crank on the front platform.—*St. Louis Miller*.

There must be some mistake here in the calculations. Allowing a distance of ten feet from the quicksilver reservoir to the point where it strikes the wheel, then the utmost force yielded by the fall of the 800 pounds of liquid metal will be a little less than one quarter of one-horse power. To pump up the liquid again would keep the brakeman constantly at work. He could propel the car faster and to better advantage by simply walking behind the vehicle and pushing it forward with his hands, thus dispensing with the weight. and cost of 800 pounds of quicksilver, reservoirs, pipes, wheels, &c. In order to realise three-horse power from a wheel arranged as above, 10,000 pounds or five tons of quicksilver would be required; and to pump it back the labour of fifteen men would be necessary. We fear that the new motor is destined to stand still.—*Scientific American.*

Sanitas.—This valuable disinfectant, of which we gave a full descriptive notice some time ago, is, we are glad to learn, progressing in public favour. We have received a pamphlet on the subject, but it has come to hand too late to enable us to give any notice of its contents in our present issue.

An improvement in microscopes has been patented by Mr. Ernst Gundlack, of Rochester, N.Y. This invention relates to improvements in microscopes, by which the tube is not only adjusted parallel to the supporting post, but always retained during the adjustment at equal distance therefrom, so that the position of the optical axis is not changed, but kept in line with the axis of the illuminating apparatus. The stage and object carrier are so arranged that an improved oblique illumination is permissible. The mirror and sub-stage are suspended in a novel manner.

Reviews.

RELIGION AND SCIENCE.

"Shadows of the Coming Truth." London: Elliot Stock, 62, Paternoster-row.

THIS is a book on the now well-worn subject—Religion and Science. It is, however, a thoughtfully written work, and as such we commend it to the notice of our readers. As this kind of literature is not much in our line, we shall content ourselves with letting the author describe the nature of his work by quoting his preface:—

In the present age of unprecedently rapid intellectual growth and wide general progress, the difficulty of reconciling the startling and seemingly new discoveries, which science from time to time makes known to us, with the meaning we have by long, and doubtless in many cases digressing, usage become accustomed to attach to the older revelations of religion (and which is naturally endeared to our hearts by many and reverend associations) is one that can seldom be long absent from the minds of serious and thoughtful persons. To those who are sensitive to the deep importance of this subject, and who, while convinced of the inestimable value to mankind of the Christian Scriptures and of the spiritual truth of the Christian faith, are revolted at the material, more than literal, and all but pagan interpretation so often placed upon its doctrines in the pulpits of our churches, and who believe that any such media to their comprehension are, in the present age, not only useless but actually prejudicial and destructive, the pages of this work are addressed. In them an endeavour is made to collect into something like a focus present appearances of truth, in the hope that, notwithstanding their many shortcomings, some little help may be afforded towards the eventual removal of existing obstacles to the reconciliation of science and rational philosophy with the precepts of religion; as well as to the recognition, so all important in these days, of the same fundamental truth lying at various depths beneath the surface of different creeds. It is hoped that their perusal may tend to demonstrate that, far from being newly discovered facts of nature, or freshly invented hypotheses, the laws of development and natural selection are as ancient, in their apprehension by man, as is human intelligence itself, being, indeed, the great facts taught, in their actual essence or spirit, in a special degree by the Jewish and Christian faiths, and to a certain extent by all religions.

As a matter of fact, the language of Scripture is mostly dead to our present understanding; the literal mode of expression which has sprung up of later years, side by side with the development and exposition of science, has had the effect of temporarily closing our minds to the inner sense of words, often figurative and poetic,—to say nothing of the mysteries through which facts apprehensible but in part revealed —which besides being protective (for it is scarcely to be supposed that any good object could have been served by dragging the holiest and most sensitive truths in all their nakedness through the mire of ignorance and superstition from which we are now scarcely emerged)—were at one time inspiring, that is which tended to the development of higher qualities. But it having become too often the fashion—and, although owing in great measure to the interpretations of priests, especially in the case of disciples of science—to speak of "holy writ," as containing no deeper meaning than that which appears upon the surface, it is one aim of the present writer to direct the attention of his readers to the wealth of knowledge, anticipatory and confirmative science, which is in reality to be found beneath.

There is a custom in use among artists desirous of taking in the correct proportions of a prospect, of contemplating it through a frame or funnel formed by the hand, or with half-closed eyes; by which means the attention, not being distracted by minor and closer, but only apparently larger objects, is left free to occupy itself with the features of real importance. In endeavouring to take a just view of the great subjects of nature and life, a similar shutting out of immediate surroundings and subduing of trifles is a process which the writer has not only adopted for himself, but would venture to recommend to the consideration of his readers.

It may be added that the two chapters which will be found in the Appendix, under the heading of "Destiny or Chance?" and "Thoughts on Evolution," having been written subsequently to the main contents of this volume, may be considered as supplementary to it, and even to stand—so far as they relate to the same subjects—to some extent in the light of summarised conclusions.

CHEMISTRY OF COMMON LIFE.

"The Chemistry of Common Life." By the late JAMES F. W. JOHNSTON, M.A., F.R.S. L. and E., Professor of Chemistry in the University of Durham; author of Lectures on "Agricultural Chemistry and Geology," &c. A new Edition, Revised and brought down to the Present Time. By ARTHUR HERBERT CHURCH, M.A., Oxon; author of "Food: its Sources, Constituents, and Uses;" "The Laboratory Guide for Agricultural Students;" "Plain Words about Water," &c. London and Edinburgh: William Blackwood and Sons. 1879.

IT is impossible to praise this work too much for it is full of useful information as to the chemical character of various articles of food and domestic use. To give a sample of its contents would be almost useless, for the whole volume is full of matter as to which it is difficult to say that one portion is more attractive or instructive than another.

Mr. Church states that in preparing this new edition for the press, his first aim was to respect the method, the style, and the matter of Professor Johnston's work. Thus only such corrections and such omissions have been made as the progress of science during the twenty-five years which have elapsed since Dr. Johnston's work first appeared demanded, while the additions introduced are confined to subjects congenial to the original plan of the book, and are such as are likely to prove useful in filling up a few blanks in the sketch. There is one entirely new chapter, treating of some of "The Colours we Admire," a subject which, he considers, would have specially attracted the attention of Prof. Johnston had his life been prolonged but a year or two; for he discussed with considerable fulness the somewhat similar subject of "The Odours we Enjoy," pointing out the peculiar interest attached to the artificial reproduction of natural perfumes. The analogous formation in the laboratory of natural colouring matters, one of the latest triumphs of constructive chemistry, is of still greater importance; while the further light which has been recently thrown upon the nature and functions of certain animal and vegetable pigments,—for instance, leaf-green and blood-red,—warrants the insertion of a few paragraphs descriptive of a select series of these curious compounds. It would be impracticable to specify the many lesser additions which have been made to the volume, but their aggregate number may be gauged by the numerous fresh references which have been inserted in the new Index. It would be equally impracticable to cite authority for each new statement made for figure given; the space which would have been thus occupied has been, it seems, more profitably employed. A good many of the new analyses (such as those of roots) are either wholly or partly Mr. Church's own; in fact, these and other new data have been gathered not only from his published works, but also from original material accumulated with a view to other literary or professional uses.

In some few instances are left unchanged in the text, statistics, calculations, and explanations which seemed to be of somewhat doubtful authority, but which Mr. Church has been unable to replace by more satisfactory figures and arguments; sometimes they have been retained on account of their possessing a measure of historical interest. He trusts that actual errors of statement will prove of rare occurrence, though, in a work of such wide range, he cannot hope to have altogether avoided them; and he proceeds to state that it is a happy circumstance that he had the opportunity of consulting Professor Johnston's private and corrected copy of the "Chemistry of Common Life," who had already, in two or three years, gleaned very many fresh details for his volume, so that not only has he incorporated with the revision some really valuable matter which he had gathered, but he learnt the kind of additions which Professor Johnston contemplated. He confesses, however, that the book would have been doubled or trebled in size had he not exercised a somewhat severe judgment in adding fresh matter. The work, though appearing in a single volume, contains much more letterpress than the previous issues—thanks to a smaller type, closer printing, larger pages, and the omission of a few woodcuts of chemical apparatus. These illustrations were, Mr. Church considers, in fact, no longer needed, since the appearance of cheap manuals of experimental chemistry.

But we must dissent from this view, as we think that in a book which will be read by non-technical people, such illustrations would have been very desirable.

CHRISTY ON COMMERCIAL PLANTS.

"Commercial Plants." By THOS. CHRISTY, F.L.S.

MR. CHRISTY is doing a most useful work in bringing before the public the scientific and practical points connected with various plants which are of commercial value. In pamphlet No. II. he gives an account of the nature and properties of the *Gynocardia Odorata* (Chaulmugra tree), from which we extract the following:—

"The seeds of this tree yield an oil (Chaulmugra oil) which has long been known and valued in India and China as a remedy for skin diseases and other complaints due to the impurity of the blood, and as a specific for secondary syphilis. One writer compares its action to that of mercury, over which it has the advantage of not being injurious to the system. In the Mauritius it is considered to be the only reliable remedy for leprosy, and so high a value is put upon its purity that the seeds are imported from India for the purpose of obtaining the oil free from adulteration. But it is in cases of consumption that its wonderful alterative properties are most noticeable. If the vitality be not too greatly lowered by this dread disease, this oil has been proved to be a certain cure, and has been during the last few years administered with the greatest success by the few who have been aware of its properties. The first to bring it into notice in the treatment of consumption was Prof. Richard Jones, of the Presidency College, Calcutta. This gentleman finds the curative property of the oil most remarkable in the case of scrofula in children, and other uses will doubtless be discovered as the oil becomes known. An excellent account of the plant, giving its botanical character and the medicinal properties of the oil, &c., may be found in

Bentley and Trimen's Medicinal Plants, Part 26, No. 29.

Until within the last month or two this oil has not been so extensively used in this country as it merits, from its remarkable properties. It has, however, lately attracted considerable attention, and a pamphlet (now out of print), in which many medicinal authorities are quoted, and a full account of the oil is given, has recently been compiled by Mr. Le Page.

The Chaulmagra is a large handsome tree, attaining the size of an oak or sycamore. It is furnished with entire, glossy, alternate leaves, and in April and May produces large yellow sweet-scented flowers, about one and a half inches across, growing in clusters on the old wood. The fruit is large and globular, about the size of a shaddock, and contains numerous seeds immersed in pulp. The seeds are from one to one and a quarter inches long, and about half as wide in the middle and upper end, tapering slightly below. From pressure they are often obtusely angular. The husk or shell of the seed is thin and brittle, and encloses a dark brown oily kernel.

The natives use the seeds by beating them up with clarified butter into a kind of ointment, but by Europeans the expressed oil is used. This is prepared in two ways:—First, by cold expression of the seeds; second, by boiling the pressed cake in water.

The pure oil in India is expensive, and therefore offers a great inducement to the natives to adulterate it; indeed, adulteration is carried to such an exent, and is so difficult to detect, that it has occasionally caused medical men in India to discontinue its use. Preference should therefore be given, in purchasing the oil, to that which has been expressed from the seed in this country. This I am prepared to supply. The oil is applied to ulcers and sores or eruptions as a dressing, and is also taken internally in doses in three or four minims, three times a day, a short time after meals, gradually increasing the amount, as in large quantities it is liable to cause nausea and irritability of stomach. For infants the dose is one or two drops once a day. In consumptive cases it may be taken in cod-liver oil, and in other cases in a little warm milk, or in capsules. Native doctors in India recommend that salt meats, sweetmeats, spices, and acids should not be taken during its use. To this list I may add that the same precaution should be observed with regard to tobacco. F. R. Heycock, Esq., F.R.C.S., 16A, Old Cavendish Street, W., reports a successful use of this oil. In an article on Chaulmugra in *The Practitioner* for November, Dr. David Young, of Florence, considers the oil to be of decided value in the macular and in the early stages of the anæsthetic forms of leprosy. Other testimonials to the value of this oil are referred to.

Vogel's African rubber tree (*Urostigma Vogelii—Miq.*) is another important plant referred to in Mr. Christy's pamphlet. This tree, which is stated by Mr. Neyle to yield one of the best kinds of india-rubber in West Africa, was first collected by Vogel at Grand Bassa, but was afterwards discovered in Liberia, from whence the first specimens of living plants have been sent by Mr. D. J. Dennis.

The tree grows from twenty to thirty feet high, and has large, leathery, stalked leaves from six to eight inches long, by three to five inches broad, furnished with four or five lateral veins on either half of the leaf. The small fruits, which are about the size of beans, are found on the terminal leafy branches, usually in pairs, on the stem rear the base of the leaf-stalks.

Perhaps nothing in Mr. Christy's work is of more interest than his account of the Mahway tree (*Bassia latifolia, Roxel*). The value of this tree deserves to be much more widely known than it is at present. Every part of the tree is of use to mankind, and if planted largely in those countries where it would grow, would do much to alleviate the horrors of famine, such as have recently occurred in China, India, Morocco, &c.

The tree is a native of Bengal, but is abundant in all parts of central India, from Guzerat to Behai, and is cultivated in other parts of India. It grows to a height of sixty feet, the trunk being often six or seven feet in circumference. The timber is hard and strong, close and even-grained, and is used for the wheels of carriages, railway sleepers, &c. A gum exudes from the bark.

The flowers are produced in enormous quantities in March and April, after the old leaves have fallen and before the new leaves have appeared; the crop rarely fails. The fleshy flowers fall off and cover the ground beneath the trees, and are gathered eagerly by the natives every morning during the flowering season; a single tree yields from 200 to 400 lbs. weight of flowers. These flowers are stored as a staple article of food by the Bheels and other tribes, and so valuable do they consider these trees, that in time of war the threat of cutting them down generally reduces them to submission when unruly.

The flowers when dried have somewhat the odour and appearance of Sultana raisins. Lately examined by a French chemist, M. Petit, they were found to contain half their weight of sugar, and are therefore very nourishing.

In a paper recently read before the Linnean Society by Mr. Lockwood, that gentleman stated that wild animals of many kinds troop eagerly to the Mahwah trees during the season to feed on the flowers. He was therefore led to experiment upon domestic animals, and it was found that the flesh of pigs fed upon Mahwah flowers in this country was much improved and acquired a delicate flavour. The animals so fed rapidly came into condition.

As might be expected from the quantity of sugar contained in the flowers, they yield when fermented a large quantity of spirit, as much as 6·16 gallons of proof spirit per cwt. having been obtained from them. The flavour of the spirit, roughly distilled, is very similar to that of Irish whisky, but when carefully rectified, it can be obtained exceedingly pure and free from flavour. This spirit is manufactured to a great extent in India, the Government duty on the spirits distilled (chiefly from this flower) in the Carauga, opposite Bombay, amounting to from £60,000 to £80,000 per annum. In Guzerat and Rajpootana every village has its spirit shop for the sale of the distilled liquor from the flowers. It has been found that when placed in an oak wood cask it takes a yellow tone of colour, and is then preferred to Irish whisky of high quality. The analysis shows it to be a most wholesome spirit.

The tree thrives in poor stony ground, and might threfore be cultivated on land not available for other crops. So regular is the yield of flowers, that it is said a bad Mahwah harvest has never been known in India.

The flowers when dried will keep for almost any length of time, and do not appear to be attacked by insects.

From the seeds an oil is extracted by the natives; it is used for lighting purposes and for soap-making. The smoke arising from the burning of the oil-cake, after expression of the oil, is said to be poisonous to rats, &c.

Many other interesting matters are referred to, amongst them Cocoa (*Theobroma Cacao*).

SERIALS.

"The International Review" for May, 1879. New York and Chicago: A. S. Barnes and Co.

THIS magazine opens with a very perfect little poem entitled "Jugurtha," from the pen of Mr. Longfellow, which cannot fail to attract general attention. Two articles upon matters affecting our business interests are sure to find many readers. One on the subject of Railway Pools, a question of great importance, is treated by Mr. J. W. Midgeley, who, from his position as secretary of the Southern R. R. Association, is peculiarly well fitted to deal with this topic. The other is an interesting discussion and historical review of our International Carrying Trade. Mr. F. H. Morse, formerly U. S. Consul in London, is the writer of this article, and is a thorough master of his subject. General Robert Williams contributes a thoughtful article upon the great question of army reorganisation, which has occupied the attention of Congress during the past winter.

The May number also contains two important articles by non-American writers. Miss Mulock (Mrs. Craik), the well-known author of "John Halifax, Gentleman," contributes a careful study of Sydney Dobell, the English poet. Mr. Hamerton concludes his review of the English and American painters at the Paris Exhibition.

The "International Review" is fulfilling the promise of the new management, to take and occupy an enduring position among the great periodicals of the world. It is already steadily and surely making itself felt as a strong factor in the formation of public opinion.

THOMAS ON MINES AND THEIR VENTILATION.

"A Treatise on Coal Mine Gases and Ventilation; with Copies of Researches on the Gases enclosed in Coal, &c. By J. W. THOMAS, F.C.S., Fellow of the Institute of Chemistry of Great Britain and Ireland, &c. London: Longmans, Green, and Co.

WHEN accidents and explosions in mines are of so frequent occurrence, one would like to have some guide that may serve at any rate to mitigate the results of such disasters. To all interested in mining matters this book will be found of great value, more especially to overmen, firemen, and other sub-officers of collieries. The work contains in a collective form the researches of the author "On the Gases enclosed in various Coals," which, in the form of papers, were communicated to the Chemical Society, together with other matter closely allied to and connected with the subject, the "papers" having special reference to the gases in coals and those met with in coal mines.

The book commences with a chapter on "Coal: its Foundation and Varieties;" the subsequent chapters embracing the description of various gases found in coal and coal mines, and the laws governing the same. There is also a chapter on explosions in coal mines and on board ship; also chapters treating very fully the subject of ventilation.

Instead of symbolic notation and technical terms, respective terms and names are given in order (as the author states in his preface) that they may be more readable by those unacquainted with chemical science. An appendix, containing reprints from various scientific periodicals, is also given.

Our space does not permit of quotations from this work, but where there is so much that could be given, it would be difficult for us to do so, even if we were better able. To the mining engineer and those connected with coal mines, this work, we have no hesitation in saying, will be found of great value.

POSTPONEMENTS.—We are compelled to postpone several Reviews of important works.

PARKIN'S DOOR-LOCKER.

THIS invention consists of improvements in locking or securing and unlocking doors, shutters, and such like, whether inside or outside, where a bar is used. In the ordinary way doors are secured by a bar, which, in the case of folding doors, is fastened to one of the doors, and when the doors are brought together such bar, which is provided with an opening, takes into a ring fixed to the other door, through which a padlock or lock is passed, and the same is secured by locking in the ordinary way. It is evident that by these means the lock can be wrenched off, and thus the bar is released and entrance obtained into the premises.

Now, to obviate these defects improvements are adopted, consisting as follows:— The bar is placed on the inside of the door, and secures the same, free to revolve on a pin or pivot. The bar is so formed that it projects on each side of the pin, or it may terminate with the pin. To the other door is secured a handle or knob, which terminates inside the door with a socket, to receive one end of the bar. Locks are provided on one door, or on both the doors.

The doors being closed, to lock the same the knob or handle is turned, and with it the slotted piece or socket, in such a position that on the bar falling one end drops into the slot. The slotted piece drops down, and the bar assumes a horizontal position. The lock on the door is then turned, and the bolt is shot into such slot above or below the bar, and thus the same is securely held. Sometimes a lock is also provided on the other door, and in this case the bar is recessed, so that when the bolt is shot it enters the recess, and thus the bar is bolted at each end. To unlock the doors, the locks are first turned and the bolts released, and then the handle is turned, and with it the slotted piece, and the bar by its own weight falls, thus releasing the doors.

It may be observed that in locking, the bar is provided with a cord, chain, or other means, the end of which passes through the door, by which means the bar is raised into such a position as that when the slotted piece is turned into proper position the same is released, and the bar engages in the slot and the same is locked, as before described.

The inventor and patentee is Mr. C. H. Parkin, of 23, New North-road, London, N.

BROUGH & BELL'S SELF-CLOSING TAPS OR VALVES.

THIS invention consists as follows, and is applicable to the different methods for opening, closing, and cushioning the self-closing taps or valves suitable for water, steam, or other liquids.

A metallic or cup leather piston is used, larger than the valve, and is made with hollow spindle to form a guide for the spindle of said valve. A cam or lever is employed for opening the valve. A small port is provided for admitting the fluid on to the piston from the inlet or pressure side of the tap or valve; an outlet is provided. On lifting the valve by the cam it forces the liquid or steam through the small port against the pressure in the inlet, the pressure at the inlet then lifts the valve and passes to the outlet. When the cam or lever is released, the liquid passes through the small port on to the piston, which gradually closes the valve without shock or concussion.

In some cases the liquid or steam is made to pass through a hollow spindle from the pressure side to the top of the piston before described.

A modification of the above consists in the pressure acting between the piston and valve, having the inlet or pressure side and outlet. A small valve is used for admitting the pressure on to the piston through a port, which forms an equilibrium on the piston, and thus opens the valve and cushioning piston, when the small valve is closed, which is effected by the pressure in the inlet; the liquid or steam passes through a small hole into the port, and thence to the outlet.

Another form consists in so constructing the tap that the pressure also acts between the piston and valve, and provided with the inlet or pressure side and outlet, with cam or lever for opening the valve, as described. The liquid for cushioning, however, in this valve or tap is taken from the outlet through a small hole and port on thence to the back of the piston.

The inventors and patentees are Messrs. Brough and Bell, of Sunderland.

CAMINADA'S RUDDER MOTION INDICATOR.

THE object of this invention is telegraphing on board ships from one place to another, or to several places simultaneously, and the indication of the position of the rudder on one place of the ship, or on several places simultaneously, has heretofore principally been done by mechanical apparatus. Mechanical apparatus does not, however, generally give satisfactory results. For this reason, the inventor of this apparatus has directed his attention to electricity, and has devised the following arrangement:—

On the periphery of the half of a brass ring are placed thirteen electro-magnets. Above each of these electro-magnets is placed an armature, provided one end with a hand, and a flat spring on the other, which is fixed. It is evident that the action of the spring will move the armature, which is arrested by a strip of brass, bent in the shape of a semicircle, and placed over the hands in such a manner that the armatures cannot move beyond a certain distance from the electro-magnets. The dial in this instrument is divided to indicate a motion of the rudder of 30 degrees to the right and 30 degrees to the left, at intervals of 5 degrees. Each hand of the instrument is to correspond with a division of the dial. The whole is covered with a metal casing, the front part of which is made to cover the hands when their corresponding armatures are not attracted by their corresponding electro-magnets. In order to have this instrument operate automatically by the rudder, it is necessary to fix a strip of metal to the rudder shaft (place where the tiller is fixed to the rudder), which will revolve with the rudder, and is called a contact maker.

On a board is placed a segment of metal, one-sixth of a circle (being 60 degrees), which is cut into thirteen parts of the same size, without altering the shape and size of the segment (these parts are called contacts). This board is fixed to the bottom of the ship and at such a height underneath the contact maker, that the same contact maker will slide over the contacts when the position of the rudder is altered. It must be understood that these contacts (being all small segments of a circle) have the same centre as the rudder, and that the contact maker and contact are placed and fixed in such a manner that the contact maker will rest upon the middle or seventh contact when the rudder is at an angle of 0 degrees with the ship. The consequence is, when the rudder has moved 5 degrees right or left, the contact maker will rest upon the next contact. When it has moved to 30 degrees, it will rest upon the sixth contact from the middle one. In order to make the motion of the rudder visible on the indicator, it is necessary to connect the middle contact with the middle electro-magnet of the indicator, the next contact right and left with the next electro-magnet right and left going on connecting in the same manner till at the sixth contact right and left with the sixth electro-magnet right and left.

The fourteenth binding post receives one wire of every electro-magnet, and one wire of a pole of a galvanic battery, while the other battery pole is connected with the contact maker. The contact maker will slide over the contacts when the rudder is being moved, their (the contacts) corresponding electro-magnets in the indicator will attract their corresponding armatures, and the hands will become visible on the dial until the rudder is in the required position which is shown on the indicator, when a hand will remain visible until the rudder is moved again.

It will be very easy to understand that this system is adapted for telegraphing generally on board ships, that is, to make orders known from one place to another, or to several places simultaneously (on board ships), and that it is simply necessary to know the number of orders desired to be given, and to have these painted or marked on the dial or dials, and the indicators to be constructed with the given number of electro-magnets and hands to indicate, to have them suit the purpose. The transmitters (sending apparatus) for these telegraphing instruments are constructed on the same principle as the contact arrangement described for the rudder, with a difference of motive power, it being the rudder in the one case and the human hand in the other.

The inventor and patentee is Mr. E. Caminada, of Delft, Netherlands.

AN IMPROVED TYPE WRITER.

IN this machine the types are carried by the table, which is rotated by a bevel pinion meshing into the wheel attached to its periphery. The pinion is turned by a wheel at the rear of the machine, and when the required letter comes under the follower, the latter is depressed, forcing the type downwards until it strikes the paper on the platform over which the machine travels, being moved forward by pinions which mesh into racks at the base.

When the follower is relieved of pressure, the tractile spring returns the type to its place in the table, and the follower regains its normal position.

The types are inked by rollers, which are supported by a crosspiece attached to the standard. These rollers receive their ink from the under surface of the table, and apply it to the faces of the type as the table is revolved. When it is desirable to move table without inking the types, the standard is pressed downwards so as to remove the ink rollers from the under face of the table. The upper surface of the wheel is lettered to correspond with the types carried by the table.

This machine is so compact that it is stated it may be carried in the pocket, and it possesses the advantage of great simplicity. The invention was recently patented by Mr. Jean A. Hitter, jun., of St. Martinsville, La., U.S.

DANGEROUS HOUSES.

HOUSES that are empty may become fever-breeders when they come to be re-occupied. A sanitary officer alleges that he has observed typhoid, diphtheria, or other zymotic affections to arise under these circumstances. the cause is supposed to be in the disuse of cisterns, pipes, and drains, the processes of putrefaction going on in the impure air in them, the unobstructed access of this air to the house, while the closure of windows and doors effectually shuts out fresh air. Persons moving from the city to their country homes for the summer should see that the drains and the pipes are in perfect order, that the cellar and closets are cleared of rubbish, and the whole house thoroughly aired before occupying. Carbolic acid used freely in the cellar is a good and cheap disinfectant.

LE GRAND & SUTCLIFF'S PATENT TUBULAR PILE.

In this patent system of pile driving, instead of giving the blow upon the head of the pile, and transmitting the force of impact through its entire length, the blow is delivered exactly where it is wanted, viz., at the point.

This is accomplished by using an elongated cylindrical monkey, which passes down inside the tubular pile, as shown in sketch fig. 1. The monkey is raised (two or three feet only) by means of rods or rope, and allowed to fall upon the flat heat of the solid point. The pile thus forms its own guide for the monkey.

FIG. 1.

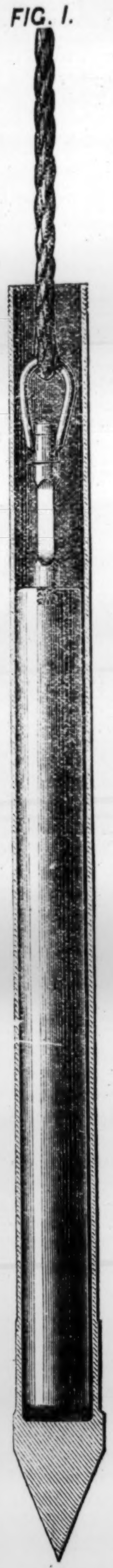
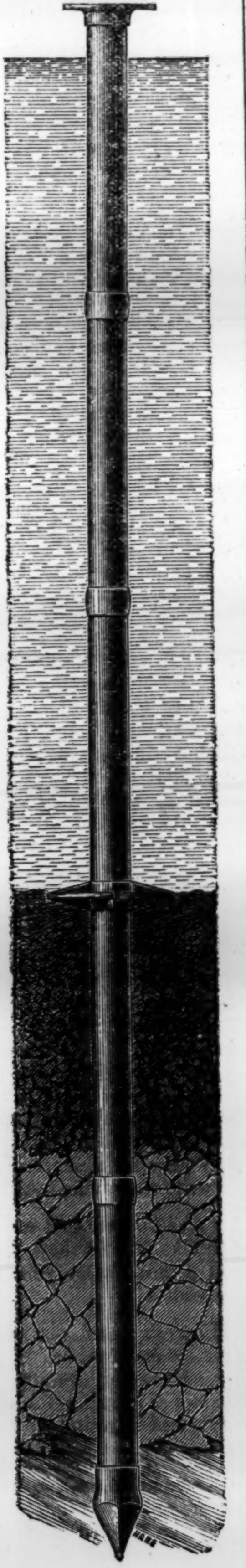


FIG. 2



It is found in actual practice, that the slightly bulbous point does all the work of penetrating, leaving but little frictional resistance for the joints that follow.

One advantage of these piles is that they can be driven with facility, of very great length, and in deep water. Thus a wrought or cast-iron pile, as shewn in sketch fig. 2, is lowered through the water length by length, screwed together by strong barrel-shaped steel sockets, until ground is reached, and additional lengths are added as the pile is driven. They can also be filled with concrete or iron cement, to increase their strength.

Additional stability is given in some cases, where the depth to which they have to be driven is previously known, by the use of a flange, which is proportioned to suit the nature of the soil into which the pile has to be driven. This flange is so placed that at the final driving it just imbeds itself on the river or sea bottom.

In most cases where a heavy column or upright has to be supported, it is preferable to employ three piles of moderate dimensions, united together at their heads by one triangular flange, forming the base of the superstructure.

Besides the numerous uses where wooden or screw piles have hitherto been employed, these piles can be advantageously used for obtaining foundations for structures, in lieu of digging and concreting, and especially for all erections constructed with columns—amongst others, footbridges over railways, elevated water tanks, &c. The rapidity and economy with which a firm foundation can thus be obtained is very great.

The inventors and patentees are Messrs. Le Grand and Sutcliff, 100, Bunhill-row, London, E.C.

A NEW FORM OF CARBON.

In describing the Sawyer-Man electric light, last December, mention was made of the peculiar carbons employed, the manner of their production being a secret which Mr. Sawyer did not choose at that time to disclose.

We have now been favoured with an exhibition of the process, and a very pretty experiment it makes. The carbons in question are about half an inch long, with the diameter of one-sixteenth of an inch. Their colour is steel gray, and the surface is hard as steel; within the carbon is tolerably soft.

In his earlier experiments Mr. Sawyer employed as the source of incandescence slender pencils of gas retort carbon in an atmosphere of illuminating gas. The carbons were slowly destroyed, but at the same time they took on a superficial deposit, evidently of carbon, but unlike in lustre and hardness any carbon that Mr. Sawyer had seen. Inferring that a more rapid deposit would be made by a denser hydro-carbon, Mr. Sawyer experimented with a great variety of such liquids, finding olive oil most satisfactory. His method is simply to heat the carbon to an extremely high temperature, by passing through it an electric current, while it is immersed in the oil. The best results are obtained by the use of a pencil of willow charcoal, upon which an intense hard deposit of carbon rapidly forms as the hydrocarbon is decomposed by the heated pencil.—*Scientific American.*

COMMERCIAL IMPORTANCE OF THE SPIRIT OF IMPROVEMENT.

The *Scientific American*, in an article headed "American Cheese in England," states that a Somersetshire dairyman, writing from England on American cheese, concludes his communication as follows:—"It seems to me that unless there be some stir and a great improvement made in the general average make of our cheese, we may give up cheese-making, and quietly allow the American, who is over 3000 miles distant, has a more difficult climate to contend with, and the extra cost of boxes and carriage, to beat us out of our very boots. Let dairy farmers open their eyes, and they will find this persevering Yankee opponent pushing his cheese into every little shop both in our towns and villages, and even hawking them to our door, while we are holding our cheese because he sells a better and cheaper article. At two factors' stores in our neighbourhood, where I saw the other day a pile of American cheese, I was told they were obliged to have them, as every one was inquiring for them, while my cheese, which I admit are not best, although better than a good many dairies, are not wanted."

SIR GEORGE AIRY ON MATHEMATICAL STUDIES.

Sir George Airy has been again endeavouring to impress on Cambridge mathematicians and the senate generally his views of the unadvisability of setting such value on what he calls "idle algebra, arbitrary combinations of symbols, applicable to no further purpose." In criticising some recent papers set in the Smith's Prize Examinations, he says that several of the subjects forming part of the recognised Cambridge course, but in which no questions were set, are more valuable to students and to men of science than all the others put together. Sir George says the use of a mathematical examination is that it tests the power of a student to apply mathematics where required. He thinks many of the examination papers as published would indicate that clever and abstruse algebra was the *summum bonum.* He sees signs of an increased desire at Cambridge to promote accurate physico-mathematical investigations, and a desire to study them among under-graduates. He would like to retain the scheme recommended by the syndicate in October last, preserving, if possible, a share in its powers to the original Smith's Prize Examiners; the money prizes might be given to the first two men in the list, and the whole class be called "Smith's Wranglers."

TO MAKE FABRICS IMPERMEABLE TO WATER.

The Bavarian *Industrie und Gewerbe Blatt* says that M. Von Mallmann, of Paris, has recently taken out a patent for a new process of rendering any woven fabric impermeable to water without affecting its colour or impeding the free passage of the air. The process consists in immersing the cloth in a bath composed of water, acetate of alumina, and Iceland moss. The latter article is first boiled in the water and the acetate of alumina afterwards added. The fabric is allowed to remain in the solution two or three hours, and then taken out and dried.

PENSÉES.

Say not my muse has ceased to sing,
Or breathe sweet words to thee!
Gives not the lark, when on the wing,
Her richest melody?
E'en so, the Poet waits to soar;
Till then, his song is mute:
His soul ne'er sleeps to wake no more,
While lives his lyre and lute!

The charms, thro' which my muse hath flown,
Still live, and breathe in thee!
And were they other than thine own,
'Twere not the same to me!
Go, take the petal from the flower;
The lily from the stream:
And death were theirs in one short hour,
And I would cease to dream.

Henry George Hellon.

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Past Presidents:

SIR DAVID BREWSTER, K.H., LL.D., F.R.S., &c., from the establishment of the INVENTORS' INSTITUTE, till his decease, February, 1868. LORD RICHARD GROSVENOR, M.P.

President, SIR ANTONIO BRADY.

SESSION 1878—1879

Members' Meeting—at 8.15 p.m.—

Thursday, May 8th.—"On Trade Mark Registration as affecting Inventors." By F. W. Campin, Barrister-at-Law.

Thursday, May 22nd.—Annual General Meeting at 4.15 p.m.

Executive Council Meeting at 7.30 p.m. on 8th inst.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts.

F. W. CAMPIN, Sec.

Proceedings of the Institute.

MEETINGS OF THE EXECUTIVE COUNCIL recently held, as appointed, have dealt with the subject of the Government Patent (No. 2) Bill, the result being the criticisms which we give in another column.

MEMBERS' MEETINGS have been occupied with the same subject.

Synopsis of Patent Bill brought in by Messrs. Anderson, Mundella, Dalrymple, and Alexander Brown:—

1 and 2. Extension of duration of Patent to *Twenty-one* years. 3. Act to apply to existing Patents. 4. Stamp duties payable on petition for Patent, £1 5s.; notice to proceed, £1 5s.; warrant, £2 10s.; sealing, £2 10s.; final specification, £2 10s.; seventh year, £25; fourteenth year, £50. Incidental stamps as in Patent Law Act, 1852.

Monthly Notices.

The Iron and Steel Institute is to hold its annual meeting in Westminster on the 7th, 8th, and 9th of May; and the British Iron Trade Association will hold its annual meeting on the 8th of May.

M. B. Henri Geissler, the inventor and constructor of the celebrated Geissler tubes, died on the 24th January.

Prof. James Nichol, F.R.S., who for a long period occupied the chair of Zoology and Comparative Anatomy in the University of Aberdeen, died recently in London. The deceased was a native of East Lothian, and was educated at Edinburgh University. For some time he was Secretary to the Geological Society of London, and afterwards Professor of Geology in Cork University. In 1851 Prof. Nichol was appointed to the chair of Natural History at Aberdeen, which he held for twenty six years, resigning the professorship in the autumn of 1877.—*Athenæum.*

Tennyson's "Lover's Tales."—Some of the daily papers, says the *Athenæum*, have been talking of "The Lover's Tale," a copy of which was sold the other day by Messrs. Puttick and Simpson, as if its origin were involved in mystery. "Authentic information concerning this rarity is exceedingly scanty," we are solemnly told, "and could perhaps only be supplied by the author or his intimate friends." The facts are really well-known. The piece was originally intended to conclude the volume of poems published in 1833, as the pagination shows, but it was, for some reason or other, excluded by Mr. Tennyson, and a few proofs only having been struck off, these with a title-page were given to some friends.

Prof. Yarnell died at Washington on the 27th of February in the sixty-second year of his age He was a member of the scientific corps of the United States Naval Observatory, and the annual volumes of the Observatory contain many most important papers by him.

Mineral Tester.—Prof. Kœnig, of the University of Pennsylvania, exhibited at a recent meeting of the Philadelphia Academy of Sciences an instrument which he has designed for making accurate determinations of the presence of certain minerals in ores, to which he has given the name of a "chromometer." It appears to be based on the fact that complementary colours will extinguish each other if mixed in proper proportions. Essentially the method of analysis consists in making a glass with the mineral to be examined and borax; this is moved over a glass wedge of a green or a red colour by means of a rack, and when the colour of the bead disappears the composition of the ore is read off upon a proper scale attached to the instrument.

In Die Chemische Industrie of March 3rd is an interesting account of the meeting of the Association for Promoting the Interests of the German Chemical Industry. Amongst other matters, it refers to a petition to the Reichstag concerning the alleged poisonous colours. As this question has again come somewhat prominently before the public, it is worth noting that the Association point out that certain dyes, such as red corallin and aurantia, denounced as poisonous, have been proved to be perfectly innocent. They pray for a commission to decide upon what colours are dangerous to the public health.

In Reimann's Farber Zeitung we find the curious statement that if cows are fed with alkanet root they yield a bluish milk, if with rhubarb (*Rheum palmatum*) a yellowish milk, and if with madder the milk is reddish.

M. Barthèlemy St. Hilaire's translation of Aristotle's Metaphysics will appear in the course of May. The Preface, which contains a history of the influence of metaphysics on the study of science and other branches of learning, forms nearly a volume by itself. It will be also issued separately in the "Bibliothèque de Philosophie Contemporaine."

Meteorological Information.—Since the 1st of last month, anyone can obtain by telegraph from the Meteorological Office the latest information as to the state of the weather in any part of the United Kingdom by payment of one shilling and the cost of the message and the reply.

CRITICAL ANALYSIS OF PATENTS FOR INVENTIONS BILL (No. 2), 1879.

THE following criticisms on this Bill emanate from the Council (Executive) of the Inventors' Institute, and we give them the most prominent position in our columns, because Inventors and the public should make their views on this all-important question known to the Legislature and Government without delay :—

Clauses 1, 2, 3, and 4.—Short Title; commencement of Act (31st December, 1879); repeal of enactments in schedule; interpretation and construction.	Not objected to.
Clause 5.—Commissioners of Patents.	The provision for the appointment of *additional* Commissioners, who it appears are to be *unpaid*, is objected to, inasmuch as they, if unpaid, cannot be relied upon as working members of the body, and hence will only tend to render same more unsatisfactory than ever.
Clause 6.—Filing of application and provisional specification. Clause 7.—Provisional protection. Clause 8.—Complete specification.	Not objected to.
Clause 9.—Publication of complete specification and effect thereof: "(1) On the filing of the complete specification the Commissioners shall make public [the same and other documents relating to application including] the provisional specification."	The words in brackets should be left out. It is very undesirable that the complete specification be published before the opposition stage has been passed. The words proposed to be struck out will give the clause the effect of publishing the *provisional* specification *only*.
"From the [publication] of the specification for the residue of the period of provisional protection, the applicant shall have the like powers, rights, and privileges as might have been conferred on him by a patent for the invention, sealed as of the day of the date of the application."	Instead of the word "publication," in brackets, the word "filing" should be substituted.
Clause 10.—On opposition, reference to and report by law officer; "(1) any person* may within the prescribed time give notice at the office of the Commissioners of opposition to the grant. (4). The law officer may if he thinks fit obtain the attendance and use the assistance of an expert.** (5.) The law officer shall report to the Commissioners his opinion whether a patent may be allowed for the invention or not. (6). The Commissioners shall then make public the report of the law officer."	Insert at * the words, "having a sufficient interest." It is really too bad that an Inventor should have to encounter the opposition of persons whose interest in opposing cannot be known, and who may be, and in practice no doubt would be, the stalking-horses of real enemies. The following words ought to be added at **. "But the applicant may challenge or object to such expert as personally, or by adverse interest, an improper person to give such assistance." Without such a provision as this the judgment of the law officer might be that of an enemy. This (6) should be struck out. An adverse report, even if overruled by the Lord Chancellor might prejudice a patent.
Clauses 11, 12, and 13.—Notice to proceed; warrant for sealing; petition for sealing.	No objection offered.
Clause 14.—Any person* may petition the Lord Chancellor against the sealing of a patent.	* Insert the words, "having a sufficient interest." The same observation is to be made here as in regard to clause 10, ante.
Clause 15.—Time for sealing, date, extent of patent; "(1) a patent shall not be sealed after the expiration of the period of provisional protection; (2) a patent shall not be sealed unless a request for the sealing thereof is made within three months, after the date of the warrant (if any), or unless (in the absence of a warrant) a petition for the grant and sealing thereof is presented within three months after the publication of the report of the law officer against the application."	1 and 2 should be struck out, otherwise an application delayed by opposition would be thrown over altogether.
Clause 16.—Duration of patent; certificate of renewal; "(1) the term limited in every patent for the duration thereof shall be twenty-one years from its date; (3) but every patent shall, notwithstanding anything therein or in this Act, cease at the end of the third or seventh or fourteenth year of its term, unless in the third and seventh and twelfth year respectively of its term the patentee takes out, at the office of the Commissioners, a certificate of renewal, which shall be granted on his request in writing."	This is highly approved of. Instead of twelfth year, substitute fourteenth. It is objectionable that such long notice be required. Many patentees are unable to know what to do till the last moment. A patent that is unpromising this year may be of much value next year.
Clause 17.—Amendment of Specification: "(5) Where leave to amend otherwise than by way of supplement is granted, any amendment shall not be allowed that would make the specification as amended claim an invention [substantially larger than or substantially different] from the invention claimed by the specification as it stood before amendment."	Strike out the words in brackets, and substitute the single word "**divergent.**"
Clause 18.—Patent to bind Crown on terms: "(2) But the officers or authorities administering any department of the service of the Crown may by themselves, their agents, contractors, and others at any time after the application, use the invention for the service of the Crown, on terms to be before or after the use thereof agreed on, with the approval of the Treasury, between those officers or authorities and the patentee, and in default of such agreement settled by [the Treasury] with the advice and assistance of the Commissioners.	Instead of the word "Treasury" in brackets, the word "arbitration" should be substituted. It is not a just course for the Treasury — a party interested on behalf of the Crown—to be the judge in the matter.
Clause 19.—Patent revocable if not used or licenses granted within three years.	This should be struck out. It is most objectionable. The compulsory working of patent will render every pa-

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tent of uncertain duration. Similar provisions in foreign patent laws are found to be mischievous, and even farcical. And compulsory licensing is most objectionable.	
Clause 44.—(*b*) For prescribing and regulating the deposit of drawings and copies thereof, and of copies of specifications and of *models* in such cases as the Commissioners think fit.	The very large powers hereby given to the Commissioners are objected to. They might make rules practically overriding the Act. Sub-section *b* would enable the Commissioners to make every applicant for a patent deposit a model, which would in some cases put him to very large expenditure. It should be struck out. Sub-section *c* enables the Commissioners to make a patentee pay the cost of printing and publishing his specification for the public benefit. This should be struck out.
The Schedule of stamp duties.	On this the Council of the Inventors' Institute remarks that *ten pounds* ought to cover the cost of a patent, and ten shillings to be the sum payable on application for provisional protection. There ought to be no deferred stamp duties. The more liberal the law is to inventors, the greater will be the progress of industrial improvement, to the manifest advantage of our trade and manufacture, which now stand in much need of being raised out of a state of depression. There are many minor objections to the Bill, but the Council have not thought it worth while to dilate on these. However, they must just observe that the Lord Chancellor and the law officers should have nothing to do in the matter except as appellate authorities. There ought to be a proper head of the Patent office, who should be the ordinary authority.

HISTORICAL NOTES ON INVENTIONS IN BREWING.

OUR cotemporary, the *Brewers' Guardian*, has been giving some notanda as to inventions connected with Brewing and Beers. After referring to a patent dated 1st February, 1792, taken out by Shannon, who, amongst other propositions of more or less importance, thus refers to the attemperator, no particular form of which is described, the inventor justly observing this must be subservient to the end proposed; but advises a shape having the greatest possible breadth and length with the least possible depth. This specification of Shannon's is worth perusal, and contains amongst much other information a dissertation on fermentation, which he defines as a species of low combustion; it also contains a suggestion for collecting the gases evolved during fermentation in casks fitted with a cock, by which the gas could be passed into any gyle of beer requiring the same. The specification occupied fifteen pages of printed matter, and is a most interesting document, but contains no drawing illustrating the various forms of brewery plant invented.

The influence of Bramah's inventions was felt in the year 1798, for we find that a novel form of beer-engine was patented by Thomas Staton, of Castle-street, Southwark, which consisted in compressing air into cylinders which were connected by pipes with the casks in the cellar, so that on opening a tap the beer was forced up another pipe to the counter to be drawn off as required. Later in the same year William Hart, of St. James's, Westminster, patented an invention for "raising liquors from the cellars to the bar of public-houses;" elaborate drawings and descriptions in this specification point out a method of raising beer by means of exhausting air from an air-tight chamber in connection with the beer-barrels; the form of apparatus is very similar in appearance to those now in use, the handle which now works the pump being used in Hart's invention for working the air-pump for exhausting the air.

In 1800, Thomas Parkinson, of Market-square, Bloomsbury, patented his so-called "hydrostatic" engine for pumping beer from the cellar to the bar; this was the first attempt to apply the pump action to this purpose, and from the drawings accompanying the specification, appears to be almost identical with the beer-engines now in use.

At this period there was a great dearth of inventions relating to the actual processes of brewing, and for some years subsequent to Shannon's patents there are none to record. In 1801, a new form of refrigerator was invented by Henry Tickell, a brewer of Mansel-street, Whitechapel, but although very ingenious it appears to be comparatively useless: he proposed to force the wort up by pumps into pipes with a number of small apertures, through which the wort escaped in the form of thin streams or showers scattered about in all directions and collected together in a large vessel, from which it passed through a flat pipe passing through a vessel having a constant stream of cold water running through it.

In 1802, a most ingenious form of vent for beer casks was invented by Thomas Barnett, an optician of Lambeth; this instrument was made of glass or metal, and in form like an inverted syphon; in the small part of the bend a little mercury was placed: when there was any pressure of gas in the cask it would lift this bead of mercury and escape, and as soon as equilibrium was established the mercury would fall back to its place; on the other hand, if air was wanted in the cask to replace the beer as drawn, it would enter by a reverse action, and subsequently the mercury would fall back to its place and close the vent as before.

In 1803 there are no inventions to record, with the exception of one for making a substitute for yeast, by Philip Storck, which is more interesting to bakers than to brewers, and another by Richard Younger, of Old-street, London, for a method for extracting worts from malt, &c.; this last consisted in placing the ingredients in a vessel surrounded by another containing water kept at a boiling temperature. Younger proposed to place the grist in cold water in the internal vessel, and then macerate them until they were raised to the boiling-point. This invention could have been of little practical utility to brewers.

NEW PATENT BILL.

GOVERNMENT—OR No. 2—BILL.

WE have received a circular, signed Wm. P. Thompson and Co., which expresses a hope that this Bill will not share the fate of its less promising predecessors, introduced by the present Government in previous Sessions; and we are at a loss to understand how any one who claims professional knowledge of Patent Law and the wants of Inventors can refer to this Bill in such terms; for, although it is *in some respects* an improvement on former attempts at legislation, it is no improvement in other respects, as the consideration of the criticisms on the Bill, given in another column, and comparison with our statement on former Bills, will, we think, convince any one.

REPORTING MACHINE.

AMONG apparatus which may be called literary aids—writing, calculating, and other machines—seen at the Paris Exhibition, was one which attracted much attention, and which has not yet been introduced into this country. It is known as "La Machine Sténographique Michela," the name of its inventor. The claims made respecting it are very broad. In the first place, it is declared that after a fortnight's practice, any person of ordinary ability can take down in shorthand characters any speech, however rapidly delivered. It is a small instrument, piano like in form, with twenty-two cases, white and black, and the stenographic characters are small and impressed on slips of paper. Signor Michela claims to have classified all the sounds which the human organs of speech are capable of producing, and to have so constructed his machine that it shall report with unerring fidelity whatever is said, German, French, Italian, and Spanish, and it may be taken for granted that English is also included, as the exhibitors announce their intention of introducing the machine into this country. The inventor even believes that his machine will do much towards the realization of that philosophic dream, an universal language. To what extent the hopes of the inventor may be realised, of course remains to be seen, but the machine is certainly highly ingenious, and seems to work satisfactorily.

AN ELECTRIC BLOWPIPE.—M. Jamin, in the "Comptes Rendus," remarks that the electric arc which plays between two carbon conductors is a true current. If submitted to the influence of a neighbouring current, of a solenoid, or of a magnet, it experiences an action regulated by the laws of Ampère, identical with that experienced by any metallic conductor put in its place, but as its mass is exceedingly trifling its speed is considerable. The author takes advantage of this fact to submit small quantities of matter to an intense heat. By causing the arc to be driven upon lime, magnesia, or zirconia, the light is directed downwards, and its intensity is increased at least three-fold.

Proceedings of Societies.

ROYAL SOCIETY.

March 20th.—W. Spottiswoode, Esq., D.C.L., President, in the chair.—The following papers were read: "Note on some Spectral Phenomena observed in the Arc produced by a Siemens Machine," "Discussion of Young's List of Chromospheric Lines," and "Note on some Phenomena attending the Reversal of Lines," by Mr. J. N. Lockyer.

March 27th.—W. Spottiswoode, Esq., President, in the chair.—The following papers were read: "On the Organization of the Fossil Plants of the Coal-Measures, Part X., by Mr. W. C. Williamson; and "Observations on the Physiology and Histology of *Convoluta Schultzii*," by Mr. P. Geddes.

GEOGRAPHICAL SOCIETY.

March 24th.—F. Galton, Esq., in the chair. —The following gentlemen were elected Fellows: Capt. A. C. Moloney, Lieut. C. G. Prater, Rev. T. J. Comber, Messrs. F. E. Pirkis, G. Palmer, and J. Smith. The lecture read was "On Geographical Evolution," by Prof. Geikie.

BRITISH ARCHÆOLOGICAL SOCIETY.

March 19th.—Mr. H. S. Cuming in the chair.—It was announced by Mr. G. Wright that the Council had accepted the invitation of the Mayor and Corporation of Great Yarmouth to hold the Congress of the year at that town. Visits would be paid to Burgh, Caistor, Blickling Hall, Dunwich, and other places of interest in the locality, closing at Norwich. Mr. L. Brock exhibited a German glass apostle cup, and several relics of old London from recent excavations, including a silver bottle which had been turned in a lathe in its fabrication. Mr. E. Way described similar excavations in Southwark, and produced a large collection of Roman articles found in them. The Rev. S. M. Mayhew reported the discovery of some remarkable Roman remains which have just been brought to light by the new drainage works at Lincoln. Seven brick bases, or pedestals, were found exactly opposite the building discovered last year and supposed to be the Prætorium. He ventured to conjecture that they were for placing upon them the standards of the legion quartered in the city. They were 4ft. 6in. high and 2ft. broad, and have been demolished. A good tesselated pavement has been found near the Exchequer Gate, and elsewhere traces of the ancient sewers of large size and capacity have been met with. The first paper was "On Ancient Thimbles," by the Chairman. After referring to statements made that these articles were of recent date he adduced evidence to show that they were well known to the Romans. The earliest examples, however, in this country and North Europe appear to have been of leather, one of that material being shown. It was in use in county Cork so late as 1820. A large number of examples of brass, dating from 1500, were exhibited. They were mostly found in London, and some of the seventeenth century have inscriptions. Several ladies who were present produced other examples, of high workmanship and finish. The second paper was by the Rev. Prebendary Scarth, read by Mr. W. de Gray Birch, and was descriptive of a Roman sepulchral inscription recently found at Bath, where several remarkable discoveries have been made in course of the drainage works.

NUMISMATIC SOCIETY.

March 20th.—J. Evans, Esq., D.C.L., President, in the chair.—Lieut. H. W. Morrieson, R.A., was elected a member. Mr. Evans exhibited a silver penny of Archbishop Aethilheard and Offa, king of Mercia, found in Cambridgeshire, one of three specimens known. Mr. Frentzel exhibited sets of the new gold and silver Japanese coinage struck in copper, a pattern dollar of Hong Kong, 1863, and a pattern quarter farthing of Hong Kong, 1868, struck in nickel. Mr. P. Gardner read a paper on a find of gold and silver coins in Bokhara, eight marches beyond the Oxus, at an old fort on a tongue of land formed by two joining rivers. The find consisted mainly of the money of early princes of the Seleucid dynasty; but among these were two gold coins of hitherto unknown monarchs—one bearing the name of Andragoras, which Mr. Gardner attributed to a prince of that name who ruled in Parthia between B.C. 330 and 250; the other having an inscription, in the Aramaic character, Pad-i-Pada Phahasp, or Phahaspes Lord of Lords. This coin, which bears a striking portrait of a king wearing a Persian tiara, Mr. Gardner ascribed to a king of Persepolis of about the same period.

STATISTICAL SOCIETY.

March 18th.—G. J. Shaw Lefevre, Esq., President, in the chair.—Mr. H. H. Hayter, the Government Statist of Victoria, read a paper "On the Colony of Victoria: its Progress and present Position." The President, in introducing Mr. Hayter to the meeting, paid him a well-merited compliment as a statistician, alluding especially to the "Victorian Year Book" as a statistical work the equal of which it would be difficult to find.

CHEMICAL SOCIETY.

March 20th.—Dr. Gladstone, President, in the chair.—The following papers were read: "On Plumbic Tetrethide," by Messrs. E. Frankland and A. Lawrence. The authors prepared this compound by adding plumbic chloride to zinc-ethyl and distilling the product in a current of steam. Ammonia, carbonic anhydride, carbonic oxide, cyanogen, nitric oxide, oxygen, and sulphuretted hydrogen do not act on this substance at ordinary temperatures; sulphurous anhydride converts it into a white amorphous mass consisting of diethylsulphone and plumbic ethylsulphinate. Prof. W. Foster gave a verbal communication "On the Production of the higher Oxides of Iron, Chromium, Manganese, and Bismuth." When the salts of the above metals are heated with an alkaline solution of sodic hypobromite, ferrates, chromates, permanganates, are formed, oxygen being evolved. Copper sulphate solution, when mixed with the hypobromite solution, evolves oxygen at ordinary temperatures." "On the Decomposition of Water by certain Metalloids," by Messrs. C. F. Cross and A. Higgin. "On the Volumetric Determination of Chromium," by Mr. W. J. Sell.

METEOROLOGICAL SOCIETY.

March 19th.—C. Greaves, Esq., President, in the chair.—The following were elected Fellows: The Earl of Derby, Messrs. R. Burniston, W. H. Crawford, J. Davies, H. Downs, S. Egar, J. S. Hodgson, S. Hollins, T. U. Hopkins, H. Horncastle, C. W. Johnson, E. U. Nelson, and F. Wilkin. The papers read were: "Dew, Mist, and Fog," by Mr. G. Dines; "On the Inclination of the Axes of Cyclones," by the Rev. W. C. Sey; and "Contributions to the Meteorology of the Pacific, No. III. Samoan or Navigator Islands," by Mr. R. H. Scott.

GEOLOGICAL SOCIETY.

March 12th.—H. C. Sorby, Esq., President, in the chair.—Messrs. L. Fletcher, A. S. Hamand, W. J. Pope, and G. W. Slatter were elected Fellows. The following communications were read: "On Perlitic and Spherulitic Structures in the Lavas of the Glyder Fawr, North Wales," by Mr. F. Rutley; "On the Gold-leads of Nova Scotia," by Mr. H. S. Poole; "On Conodonts from the Chazy and Cincinnati Groups of the Cambro-Silurian, and from the Hamilton and Genesee-Shale Divisions of the Devonian, in Canada and the United States," by Mr. G. J. Hinde; and "On Annelid Jaws from the Cambro-Silurian, Silurian, and Devonian Formations in Canada, and from the lower Carboniferous in Scotland," by G. J. Hinde.

March 26th.—H. C. Sorby, Esq., President, in the chair.—Messrs. W. A. Barron, G. Dent, Lieut. J. J. Leverson, and Rear-Admiral F. S. Tremlett were elected Fellows. The following communications were read: "Results of a Systematic Survey (in 1878) of the Directions and Limits of Dispersion, Mode of Occurrence, and Relation to Drift-deposits of the Erratic Blocks or Boulders of the West of England and East of Wales, including a Revision of many years' previous Observations," by Mr. D. Mackintosh; and "On the Glaciation of the Shetland Isles," by Mr. B. N. Peach.

ASIATIC SOCIETY.

March 17th.—Sir E. Colebrooke, Bart., V.P., in the chair.—Messrs. Abul Fazl Abd-ur Rahman, P. Cababé, and J. C. A. Scott were elected resident members, and Mr. A. S. Faulkner a non-resident member. A paper was read, contributed by Mr. A. H. Schindler, "On Historical and Archæological Notes of a Voyage in South-western Persia in 1877-8." In this paper Mr. Schindler described his march from Tehran south-west, calling attention to the fact that many places still retain in their names a remembrance of the old rule of the Sassanians, such as Bahram-abad, Firuzabad, Khorabad, Khurshidaban, and Shemsabad, pointing out, too, the existence of many ruins of Guebre Dakhmeds, and of other places recalling the names of Mazdak and Mani. He also gave a special account of a curious inscription, written partly in Cufic and partly in Neshki, on an old tower to the north of Khorremabad, which has not yet been completely deciphered, but bears the date of A.H. 517 or 519. He then gave some interesting details of the water system of Susiana, especially in the neighbourhood of Shuster, which was first described, more than thirty years ago, by Sir H. C. Rawlinson, in an early volume of the *Journal* of the Geographical Society.

SOCIETY OF ANTIQUARIES.

March 13th.—Dr. W. Smith in the chair.—Mr. J. G. Waller exhibited a small silver brooch, flat and annular, with the not quite modest inscription, IE AI GENTI CORS A MON AMI; date, late fourteenth century. Mr. S. D. Walker communicated an account of the curious and interesting caves at Nottingham, excavated on the Bunter rock of the New Red Sandstone, commencing at Lenton, on the west of the town of Nottingham, and extending to Sneinton, at the extreme east the town. These caves Mr. Walker considered to be the remains of a Roman sepulchrum commune. Two of them contained contained traces of the bustum for incineration of the remains, while another exhibited all the arrangements of a regular columbarium, with upwards of 150 cells for the reception of cinerary urns. Mr. R. S. Ferguson communicated a paper "On the Archæology of Cumberland," which he had already laid before the Archæological Institute, and of which an account has been given in the report of the February meeting.

LINNEAN SOCIETY.

March 6th.—W. Carruthers, Esq., V.P., in the chair.—Prof. J. R. Greene, Dr. P. H. Stokoe, R. Johnston (Tasmania), B. S. Williams, and Prof. J. Wood Mason were elected Fellows. Mr. T. Christie exhibited and made remarks on a series of specimens illustrating the little-known Australian Pituri plant. Mr. R. I. Lynch showed a growing example from Kew, and dried leaves of *Xanthosoma appendiculatum* bearing pouch-like excrescences from the midrib. A letter was read referring to the increased production of beetroot sugar by careful artificial selection of the beet. The saccharine produce of sugar-cane, on the contrary, remains stationary, the crossing and selection of it being suggested to ensure better commercial results. A paper was read "On Parasitic Algæ within living Bryzoa and Sponges," by Dr. P. F. Reinsch. In a note on the fruiting of *Wistaria sinensis* in Europe, by Mr. W. T. Thiselton Dyer, the author avers, from his own and others' observations, that plants trained on a garden wall at Glyon, east end of the Lake of Geneva, yield abundance of brown tomentose pods annually. Near the town of Geneva, however, fruiting is of rarer occurrence, but again more frequent at Lyons and the Rhone valley. Fruiting, he suggests, may be a question of temperature, and not of nutrition dependent on presence or absence of support to the stem and branches. From the above and other data Mr. Dyer fails to see the evidence of the antagonism of the vegetative and reproductive forces as asserted to be the governing law according to Mr. T. Meehan's experiments and lately quoted by the Rev. G. Henslow. If such barrenness were the case with the scandent habit, then *W. sinensis* would probably already be extinct. The Secretary read a paper "On the Classification of the Maioid Crustacea or Oxyrhyncha," by Mr. E. J. Miers. The maioid crabs have been placed by nearly all carcinologists at the head of the Brachyura, from the high degree evinced in their sensory organs and nervous system, and the group, moreover, is interesting on account of the variety of types. Though closely related to the Oxystomata, the Oxyrhyncha differ from them in their triangulate buccal cavity and position of afferent branchial channel; but Mesorhæa approximates on the part of the Parthenopidæ to the Oxystomatous type. From the cancroid crabs (Cyclometopa) typical Maiidæ are distinguished by longitudinal antennules and position of basal antennule joint, the Parthenopidæ, however, occupying an intermediate place between the rest of the Oxyrhyncha and certain cancroidea. The author reviews others' classifications, and then gives a synoptical arrangement according to certain anatomical configuration and functional deportment of their buccal cavity, situation of afferent and efferent canals, genital appendages, &c. He divides the group into four families, twelve subfamilies, one hundred and six genera, and fourteen sub-genera, giving short diagnoses of each.

MARCH 20TH.—W. Carruthers, Esq., V.P., in the chair.—The Rev. G. E. Commesford-Casey was elected a Fellow. A paper, by Mr. F. Smith, "On New Aculeate Hymenoptera from the Sandwich Islands, collected by the Rev. T. Blackburn," was read. The author states the general aspect of the series is certainly North American, with mixture of a few South American forms. The ants are most diverse in character, some being cosmopolitan in range. The house ant of Madeira is common, and the little European ant (*Ponera contracta*) unexpectedly turns up here. Some observations on the reproduction of ferns, by Mr. T. R. Sim, were also read by the Secretary. Among the great collection of living ferns at Kew a marked feature is the large number of species that regularly bear adventitious buds. Of a thousand species there grown, barely fifty are ever found without buds, and some forms produce them regularly, though the normal forms do not. The above number seem very high when compared with Phanerogams, where adventitious buds, with some few exceptions, may be said never to be normal. Among viparous ferns the contrary obtains, and the buds are always on the same part of the plant in all the individuals of a species, *Polystichum angulare*, for example, bears a bud on the rachis in the axil of almost every pinna on the lower part of the frond, in some all up the rachis. Some Aspleniums produce them on the veins of the upper surface of frond, but never directly through from a sorus. Great variety in position, however, is manifested in different genera and species where budding occurs, various examples of which the author gives. Where buds become detached, considerable difference obtains as to the size and stage of separation, whereof many instances are pointed out and other curious instances of deviations related by the author. In commenting on the subject, Sir J. D. Hooker stated his belief that ferns at Kew were more bulbiferous than in their natural state, possibly from more constant nutrition and warmth. The fifth contribution to the ornithology of New Guinea, namely, recent collections from the neighbourhood of Port Moresby, was read by the author, Mr. R. B. Sharpe. The interesting series dwelt on were obtained by Mr. K. Broadbent, and usefully compare with those got by Signor D'Albertis from the Fly River. A parrot of the genus Aprosmictus closely resembles one from the Fly River, but nevertheless is distinct, offering thus a parallel case to the crowned pigeons *Goura Albertisi* inhabiting Port Moresby, and *G. Sclateri* the Fly River. At present the affinities of the south-eastern species seem to be with those of Australia, and a few with those of the Aru Islands. Mr. W. T. Thiselton Dyer exhibited *Helichrysum vestitum*, a perennial everlasting, from the Cape of Good Hope.

ENTOMOLOGICAL SOCIETY.

MARCH 5TH.—J. W. Dunning, Esq., V.P., in the chair.—The chairman referred to the great loss sustained by the society in the death of Mr. F. Smith, of the British Museum. M. C. Brongniart, of Paris, was elected a foreign member, and Mr. J. T. Harris a subscriber to the society. Sir S. Saunders exhibited a series of bees belonging to the genus Halticus from Greece, containing several remarkable new forms. The following papers were communicated: "On some New Species of British Hymenoptera," by Mr. P. Cameron; and "Descriptions of some New Species of Coleoptera from New Zealand," by Dr. Sharp.

MICROSCOPICAL SOCIETY.

MARCH 12TH.—Dr. Beale, President in the chair.—Lord Justice Bramwell and six other gentlemen were elected Fellows, and seven nominations were made for the next meeting. The following papers were read:—"Contribution to the Knowledge of the British Oribatidæ," by Mr. A. D. Michael; "The Development and Retrogression of Fat Cells," by Mr. G. and Mrs. F. E. Hoggan; "New Microscope with Swinging Sub-stage and Improved Motions," by Mr. J. Beck; and "The Use of Osmic Acid in Microscopical Preparations," by Mr. T. J. Parker. Other papers, by Prof. Keith, Mr. R. B. Tolles, and Mr. Crisp were taken as read or postponed in consequence of want of time. The new 1-18 oil-immersion objective by Zeiss was exhibited, with remarks by Prof. Abbe on the "Stephenson homogeneous immersion system."

PHILOLOGICAL SOCIETY.

MARCH 7TH.—Dr. J. A. Murray, President, in the chair.—Mr. Leland, in a paper "On the Origin of the Gypsies," while agreeing with Captain Burton that the Jats of North-Western India had probably furnished the main stock of the race, also held that the Luris of Persia and the Doms had greatly contributed to form it. He suggested that the word "Dom," a male Gipsy, "Domni," the female Gipsy, and "Domnipana," Gipsyhood, reappear in the English "Rom," "Romni," and "Romanypen," which have the same meanings. Mr. Leland indicated other analogies between these races. He suggested that as Indian Gipsies had previous to their appearance in Europe passed themselves off in Egypt as religious pilgrims from Yemen, the precedent probably induced them to do the same in Christendom, and that from this they called themselves Egyptians. As to the much-disputed term of Zingari, Mr. Leland inclined to put faith in the Gipsies' own account of its derivation from Chen, the first Gipsy chief, who left India for Turkey, and who married his sister Guin, whence the word "Chenguin." He had positively ascertained that there are in India Gipsies who call themselves and their language Rom. Mr. Leland attached particular importance to the fact that from their first arrival in Europe the Gipsies were known as eaters of animals which had died a natural death—a characteristic of the pre-Aryan races, and especially of the Doms; that they were musicians and actors like the Luris, and jockeys and bold robbers like the Jats. Mr. H. Nichol then read a paper "On the Old French Vowel End-Law, first enunciated in 1871 by Prof. Zupitza."

MARCH 21ST.—Dr. J. A. H. Murray, President, in the chair.—Mr. R. N. Cust read a note from Prof. Ascoli about his forthcoming work on the Old Irish texts of the Ambrosian Library and St. Gall. Mr. H. Nichol read the second part of a paper on the old French Vowel End-Law, in which he classified the chief consonant combinations after the accented vowel according to their taking or not taking unaccented *e* after or between them, where the Latin vowel of the final syllable was not *a*. It was noted that most combinations whose last element was a liquid or nasal required *e*, while but few of those ending in *s* or a mute did so; and especially that, while combinations originally ending in consonental *y* took final *e* in Provencal only when assibilated (*gatge* from Teut. *wadium*. but *ali* from Lat. *oleum*), they all took it in Old French (*guage*, subst., now *gage*, and *olei*, now *huide*), though final *dzh* in verbs became *ts* instead of taking *e* (*guaz*, 1st sing. pres. ind., from *guagier*, now *gager*), and final *tsh* was common in Northern French (Picard *brach*, usual Fr. *bras*, from *brachium*).

SOCIETY OF ARTS.

MARCH 13TH.—Mr. T. Wills in the chair.—A paper "On the Injurious Effects of the Air of large Towns on Animal and Vegetable Life, and on Methods proposed for securing Salubrious Air," was read before the Chemical Section by Mr. W. Thomson.

MARCH 17TH.—The fifth lecture of his course "On Dwelling-Houses, their Sanitary Construction and Arrangements," was delivered by Dr. Corfield.

MARCH 18TH.—Sir T. Fowell Buxton, Bart., in the chair.—Six members were proposed for election. A paper "On Africa, a Paramount Necessity for the Leading Industries of England," was read by Mr. J. Bradshaw. The paper was followed by a discussion on the various schemes that have been proposed for the introduction of trade and civilisation into the interior of Africa.

MARCH 19TH.—Lord A. S. Churchill in the chair.—A paper "On Economical Gardens for Londoners" was read by Mr. W. M. Williams.

MARCH 24TH.—Mr. B. F. Cobb in the chair.—The sixth and last lecture of his course "On Dwelling-Houses, their Sanitary Construction and Arrangements," was delivered by Dr. Corfield.

MARCH 25TH.—Mr. F. A. Abel in the chair.—Five candidates were proposed for election as members. A second communication "On the Treatment of Iron to Prevent Corrosion" was read by Prof. Barff.

MARCH 27TH.—Mr. F. A. Abel in the chair.—A paper "On the Inoxidation of Iron and the Coating of Metals and other Surfaces with Platinum by the Processes of M. Dodé" was read before the Chemical Section by M. L. M. Stoffel. After the reading of the paper M. Dodé, who had come specially from Paris to attend the meeting, explained various points referred to in the paper, and replied to the numerous questions raised in the discussion.

March 28th.—Sir J. Elphinstone in the chair.—A paper "On the Practicability and Advantage of a Ship Canal through the Island of Ramisern" was read before the Indian section by Mr. S. M'Bean.

April 1st.—Mr. W. H. Preece in the chair.—A paper, by Mr. Sivewright, "On the Submarine Telegraph to South Africa," was read by Mr. Mann. Some old maps of Africa, published in the fifteenth and sixteenth centuries, were exhibited and explained by Mr. R. Ward.

April 2nd.—Mr. A. Cassels in the chair.—Seven candidates were proposed for election as members. A paper "On some Causes for the Recent Depression in Trade" was read by Mr. B. F. Cobb.

MATHEMATICAL SOCIETY.

March 13th.—C. W. Merrifield, F.R.S., President, in the chair.—Mr. J. D. H. Dickson was admitted into the society; Mr. R. Hargreaves and Prof. W. E. Story were elected members; Mr. D. M'Alister was proposed for election. Prof. Cayley spoke briefly but in high praise of the late Prof. Clifford's work as a mathematician, instancing more particularly his papers "On the Canonical Form and Dissection of a Reimann's Surface," "On Mr. Spottiswoode's Contact Problems," and "The Classification of Loci." The Chairman, the Rev. A. Freeman, and Dr. A. Hirst added a few remarks on the loss the society and the mathematical world had sustained, and expressed the hope that steps would be taken to secure the publication, if desirable, of any mathematical papers Prof. Clifford might have left. Dr. Hirst made a statement respecting the "De Morgan Memorial" medal to be presented to the society; it appeared that the bust and die for the medal had been executed by Mr. Woolner, and that after all claims had been met there would still be a small sum required to make up the requisite total for the purpose contemplated. The late Prof. De Morgan was the first president of the society, and always took a warm interest in its advancement. It was resolved that a subscription list should be opened, in order that old pupils and members of the society might have an opportunity of aiding in the above design. Subscriptions for this special purpose may be sent to Mr. Tucker (Hon. Sec. University College School, W.C.), or to Mr. Alfred Wills, Q.C., 12, King's Bench Walk, E.C., the honorary secretary to the general fund. Copies of the medal were exhibited (profile, with dates of birth and death; on the reverse, his own design, Pascal's hexagram surrounded by the "Zodiac of Syllogisms" and the title "President of the London Mathematical Society"). The following communications were made: "On Different Equations, Total and Partial, and on a new Soluble Class of the First and an Exceptional case of the Second," by Sir J. Cockle; "Discussion of two Double Series arising from the Number of Terms in Determinants of Certain Forms," by Mr. J. D. H. Dickson; and "Two Geometrical Notes relating to Surfaces of the Second Order," by Prof. H. J. S. Smith.

PHYSICAL SOCIETY.

March 8th.—Prof. W. G. Adams in the chair.—Dr. Hurst and Mr. Jacob were elected members. Prof. Ayrton brought forward a new theory of terrestrial magnetism, originated by himself and Prof. Perry, of the Imperial Engineering College, Japan. Dr. J. Hopkinson read an account of some experiments with the quadrant electrometer, which showed that Prof. Clerk Maxwell's formula for the sensibility of the electrometer $(A—B)\left(C—\frac{A+B}{2}\right)$, where A and B are the potentials of the two pairs of quadrants, and C the potential of the needle, only holds good when C (the charge of the jar or needle) is less than 200 Daniell elements. Above that a different law appears to hold. Dr. Hopkinson also remarked that any degree of low sensibility down to zero could be got from the electrometer by connecting a condenser to each pair of quadrants and adjusting their capacities. Mr. F. D. Brown described his apparatus for maintaining constant temperatures and pressures.

March 22nd.—Prof. W. G. Adams, President, in the chair.—Capt. H. R. Lees was elected a member. Capt. Abney read a paper "On Obtaining Photographic Records of Absorption Spectra." Prof. Guthrie, F.R.S., read a paper on "On the Fracture of Colloids as illustrated by Experiments on the Breakage of Glass Plates, either by Pressure or Heating at the Centre or round the Circumference."

HISTORICAL SOCIETY.

March 13th.—James Heywood, Esq., in the chair.—Five ordinary members were elected. The secretary intimated that the society's prize of ten pounds, granted to the Art Department at South Kensington, had been by the examiners awarded to Mr. Merritt. Dr. Rogers read a paper "On the Study of History," in which he referred to certain historical errors which had been corrected through the researches of members of the society; and Rev. A. R. Pennington read a paper entitled "The Uses of History."

ANTHROPOLOGICAL INSTITUTE.

March 11th.—Dr. E. B. Taylor, President, in the chair.—The President read a paper entitled "The Geographical Distribution of Games," in which attention was called to the games of Polynesia and America as proving that a drift of civilization from Asia reached these regions before they were known to Europeans. The draughts played in the Sandwich Islands and New Zealand were not our modern game, but apparently some variety related to the ancient classical game (which is alive in Egypt to this day). It may have reached the South Sea Islands from Eastern Asia together with kite-flying, at which they were expert, and which they perhaps had before the comparatively modern time when it reached England.

March 25th.—Mr. E. B. Tyler, President, in the chair.—Mr. H. Seebohm gave some particulars respecting the native races of Arctic Siberia, accompanied by an exhibition of ethnological objects collected in that region. In 1874 he visited Lapland, and in the following year he proceeded from St. Petersburg to Archangel, and thence 600 miles eastward, where he first came in contact with the Samoeides, and obtained some particulars about the Voguls, who dwell across the Ural range. But his most adventurous journey was in 1877, when he accompanied Capt. Wiggins on his expedition for the exploration of Arctic Siberia. In the Tartar villages in which they found themselves they were astonished to find that where the Crescent predominated over the Cross it seemed to be the symbol of a superior civilisation and order. The native languages were akin to the Turkish. The copper coloured Buriats, who dwell behind the Baikal mountains, were a somewhat different race, and bore a strong resemblance to the Chinese. The Ostiaks and Dolgans were located on the colossal river Yenesei, which was reckoned the third largest river on the face of the globe. The Tungoosks were settled on one of the chief tributaries. The costumes, weapons, tools, smoking appliances, reindeer-harness, snow-shoes, snow-goggles, idols, &c., of these and kindred tribes were shown, together with a remarkable case of pre-historic bronzes, found in ancient Siberian graves, and thought to be from 4000 to 5000 years old. A paper was read by Sir C. Nicholson "On some Rock Carvings found near Sydney, New South Wales. Rude carvings of human and other animal forms, especially kangaroos and fishes, including the whale, had been found at various points on the coast of New Holland, from Cape Howe to Moreton Bay. The present natives had no tradition as to their origin, yet there were no good grounds for refusing to regard them as works of indigenous art. Col. Vigors had copied many of them, and a number of his drawings were handed round. One of these carvings represented a whale thirty feet long. Those found in Sydney cavern included a kangaroo and a man erect with outstretched arms. Another class of similar carvings were chromatic. They were found on the north-west coast, and had been plausibly supposed to be the work of Malay pearl-fishers or shipwrecked sailors.

SOCIETY OF BIBLICAL ARCHÆOLOGY.

April 1st.—Dr. S. Birch, President, in the chair.—The following communications were read: "On the Historical inscriptions of Seti I. in the Temple at Karnak," by Dr. E. L. Lushington; and a translation, by M. Eugene Revillout, of a document recording a lawsuit tried before the Laocrites during the reign of Ptolemy Soter (B.C. 305 to 285).

PHOTOGRAPHIC SOCIETY.

March 11th.—J. Glaisher, Esq., in the chair.—The following papers were read: "On Coloured Glass suitable for the Developing Room, and on the Employment of Sulphate of Quinine as a Substitute," by Capt. Abney; and "On the Gelatine Emulsion Process," by Messrs. C. Bennett and W. Wainwright, jun. Mr. H. Grubb exhibited a new stereoscope, in which much larger pictures than ordinary could be shown.

HOW OYSTERS ARE FRESHENED AT BALTIMORE.

The oysters are transferred from the pungies on to the decks of covered scows that will each carry a deck load of about six hundred bushels of oysters. The scows are then towed to a point in the Patapsco River where the water is quite shallow, and then sunk by letting water through a valve into the hold. The scows are left in this position during two flood tides, when the water is pumped out and they are then towed to the city again. The change from the salt to the fresh water swells the oysters until what were originally comparatively insignificant oysters, worth but sixty cents a bushel, become plump and luscious, fill entirely their immense shells, and command in the market from one dollar and fifty cents to one dollar and sixty cents a bushel. Two of the largest packing-houses in Baltimore are engaged in this business, keeping twelve scows constantly employed. The whole operation is under the supervision of one man, who undertakes the freshening for a consideration of ten cents a bushel, the packing-houses referred to finding all the appliances.

The Scientific Works to be published by Messrs. Spon comprise "The Electric Light in its Practical Applications," by Dr. Paget Higgs; "A Collection of Decimal Tables of Weights, Measures, &c.," to serve as an appendix to "Molesworth's Pocket-Book of Engineering Formulæ," by Guilford L. Molesworth, M.I.C.E., Consulting Engineer to the Government of India for State Railways; "On Steel, its History, Manufacture, and Uses," by J. S. Jeans, secretary to the Iron and Steel Institute; "A Treatise on Tunnelling in Heavy Ground," by Mr. C. F. Gripper; and "Corliss Engines and Allied Steam Motors," by W. H. Uhland, translated by A. Tolhausen, C.E.

PROGRESS.

I.

We who record on this our page
The swift advances of the age;
We who respond with Pæan tones
To triumphs of the mighty ones;
Applauding, or when rocks are shred,
Or worlds are scanned, or sounds are sped;
Or when we note each mystery
Of new-devised machinery;
We, poising at a point of Time,
Ere to fresh date our life must chime,
Would pause and ask,
Ere we resume our task,
The leaders of our mental race
Also to pause with us a little space.

II.

Oh! spirit chieftains of Mankind!
Ye monarchs of the realms of mind!
Who stand as on the utmost height
Of some thronged Temple of the Light;
We, who as acolytes waft clouds
Of incense from the wond'ring crowds,
And join their shout when ye wrest lore
From treasuries deep-locked before,
And cheer when free your banners wave
Old-world illusions to their grave—
Now change our strain
Your ear to gain:
Now—while below the throng are decking
Your temple walls with spoil and wrecking,
Our censers we forsake
Counsel with you to take
For one short hour, our tribute checking,
Lest incense-clouds your crests be flecking;
Lest danger near you, or deception hide,
E'en on your pinnacles of state and pride!

III.

Hear us, O Masters!
One report
We bear you from that lower court
Is harsh and sharp, an ailing chord,
A protest not to be ignored!
Nor even waived if ye would be
True leaders of humanity:
Hark! while those whispers swell and mount,
Of their sad burden take account!
Thus say the men of low estate
Who on your new inventions wait:—
"Engine-wheels of mazy tread
Tell of gored and ghastly dead,
Of house-arts fled,
Of old ties severèd!"
Nay! some in murm'ring take up this reproach,
"That toilers now do to machines approach,
So little does their work on Thought encroach!"

IV.

An answer falleth on our ear
From your empyrean high and clear;
'Tis brief, exultant—yea, severe!
Ye will not deign to make defence
Unto the churls who take offence;
Ye blame the inelastic soul,
So slow to grasp its new control;
"If some inventions have reverse,
The better may repair the worse!
If some researches lead to woe,
'Tis but to minds earth-bound and slow!"
And then above in thrilling chorus
Ye chant your feats in strains sonorous,
Such gains achieved!
That the aggrieved
Repent their blame and ask that ye recite
Once more the wonders which *should* all delight!

V.

Thus ye proclaim, for deathless Fame,
"Man's welfare is our only aim!
The plough, the helm, the press we speed,
Till magic haste subserve his need;
No daunting depth for us exists,
No gloom our lightning beam resists,
Our apparatus can confer
With slightest stir of gossamer;
Our scientific tests can probe
The substance of each starry globe;
Our measurement of solar chasms,
Our scrutiny of protoplasms,
Aye, and our trace of evolution,
(Causing dogmatic revolution;)
Urge us to trend
Till we shall rend
(Scorning some airy spectral foes,)
One ling'ring veil which yet doth interpose,
Screening the springs of life and life's dim close,
And passing this, the soul all fear o'erthrows." . . .

VI.

Hold now! ye sages!
There doth brood
Among the list'ning multitude,
Among the wisest, purest there,
A moan that burdeneth the air:—
Hark! now is breaking from the throng
Of serried thinkers all along
A wail, a vehement outcry
Of troubled, worn, humanity!
Dismayed at view of life—bereft
Of the slight reverence still left,
Of the sweet haze
Of earlier days!
Days blest and lit by communings sublime,
Which all refuse with your results to chime,
And which forbad that Thought so proud should climb.

VII.

O, spirit chieftains of Mankind!
Ye monarchs of the realms of mind!
Now must we join yon urgent throng,
Sharing their dread of luring wrong!
Scorn not our protest deep and strong—
Oh! trust not feeble mortal sight
For guidance to supernal Light—
List! to the Oracle which stirs
That Veil which your advance deters!—
That awful Veil which yet hath rifts;
That Veil which to the humble lifts;—
List to the utt'rances benign
Which reach *them* from the inner shrine!
Bow with the child
Where reconciled,
Are earth's faint praise and chants of seraphim,
The soul's bright visions and this twilight dim—
Learn still at that low shrine, and ye shall be,
True Pioneers for all Humanity!

I. G. R.

December 21, 1878.

LIGHTHOUSE ILLUMINATION BY ELECTRICITY.

By J. N. Douglass, M. Inst. C.E.

At a recent meeting of the Institution of Civil Engineers, Mr. Bateman, President, in the chair, the paper read was on "The Electric Light applied to Lighthouse Illumination."

The author showed the progress of lighthouse luminaries from wood and coal fires to the introduction of tallow candles, fatty oils, mineral oils, coal gas, and electricity. In 1839 experiments were made by Faraday, for the Trinity House, at the Orford Low Lighthouse, with the Bude light, in 1862, at the South Foreland with the Drummond or lime light, but the results were not so satisfactory as to lead to their adoption. In 1857 experiments were tried at Blackwall with the electric light, produced by the first magneto-electric machine of Holmes; and on the 8th of December, 1858, the electric light, obtained by Holmes's second machine and a "Duboscq" lamp, was shown on the sea for the first time from the South Foreland High Lighthouse.

On the 1st of February, 1862, the Trinity House exhibited the electric light permanently at Dungeness Lighthouse by Holmes's magneto-electric machines and lamps. The works for the production of the light were described, and the first cost and maintenance given. The intensity of the electric luminary was about 12⅓ times that of the oil luminary. The cost per unit of light per hour was 0·1165d. for the oil, and 0 1294d. for the electric light. Frequent falling off of the latter light occurred, and the oil light had occasionally to be substituted. Shortly afterwards the French lighthouse authorities established the electric light at Cape La Hêve with the magneto-electric machines of the Alliance Company of Paris. In 1867, Holmes further improved his machine and lamp. Two of these machines and lamps were exhibited by the Trinity House at the Paris Exhibition of 1867, with a dioptric apparatus of the third order. The Souter Point Lighthouse was lighted by electricity in January, 1871. The light was adapted to a dioptric apparatus of the third order. A lower light from the same luminary as the upper one was adopted here for the first time. The optical apparatus for both lights was designed by Mr. James T. Chance, M.A., Assoc. Inst. C.E. A "Holmes" fog trumpet apparatus was also worked from the same engines as the electric light apparatus. The total cost of the works was £18,000. The cost of the electric luminary per candle per hour was 0·056d., being rather less than half of the cost per unit at Dungeness. The maximum intensity of the beam from this apparatus was about 700,000 candles. The Trinity House next established the light at the South Foreland High and Low Lighthouses, in January, 1872. The apparatus for the production of the light consisted of two steam engines of twenty effective horse power, four Holmes's improved magneto-electric machines and lamps, and two dioptric apparatuses of the third order for fixed white light. The cost of the additional works for these lights was £14,800. The intensity of the full power beam from the High Lighthouse was about twenty times that of the old first order dioptric oil light. The relative cost per unit of light was as 100 oil to 30·6 electric. In 1873 the Trinity House adopted, for the Lizard Lighthouses, Siemens's dynamo-electric machine and lamp, and a siren fog signal. These were driven by three of Brown's caloric engines, each of effective horse power. The cost of the additional works for these lights was £14,936, and the annual maintenance, including interest on first cost, amounted to £2365 6s. 4d. against £1016 7s. 11d. for the oil lights. The intensity of the full power beam of each light was about 330,000 candles, being about 211½ times the intensity of the oil light. The relative cost per unit of light was 100 oil to 14·04 electric. The successive improvements in the electric machines and in the means of driving them had reduced the cost of the electric light at the Lizard to one-ninth of that at Dungeness, and the quantity of light produced at the Lizard per pound of coke consumed was increased 20 times.

The continued growth seaward of the shingle point at Dungeness led to the removal, in 1876, of the original electric light apparatus, and the substitution of a low flashing oil light and siren fog signal for both lighthouses.

The author furnished information received from M. Allard, Director-General of the French Lighthouses, relative to the electric lighthouses at Cape La Hêve and Cape Grisnez, where Alliance magneto-electric machines and Serrin lamps had been adopted. It was intended to exhibit the electric light in the present year in a new lighthouse on the Isle of Planier, opposite Marseilles, and it had been decided to substitute the electric light for the oil light in the Palmyre Lighthouse at the mouth of the Gironde. Some information was also given relative to the electric lighthouses at Odessa and Port Said, these making ten in which the electric light had already been established.

The comparative cost and efficiency were shown of lighthouse luminaries produced by all the agencies at present employed, viz., oil, coal gas, and electricity. Coal gas, on Wigham's system, was applied to the Howth Bailey Lighthouse, Dublin Bay, by the Commissioners of Irish Lights, in June, 1865, and it had since been extended to seven lighthouses on the coast of Ireland. In 1872 the Trinity House adopted it at the Haisborough High Lighthouse. The additional cost of the works necessary for the introduction of gas at this station was £1996, and the annual maintenance of the gas establishment, including interest on first cost, &c., amounted to £832 4s. 3d. This light had a mean intensity of 1173 candles, and a maximum intensity for thick weather of about 2923 candles. In 1877 the necessary additions were made for lighting the Low Lighthouse (distant 766 yards) by gas from the same works, at a cost of £1296. The system of Mr. Wigham had been further developed by introducing the flames of two, three, and four large burners over each other in the axis of the dioptric apparatus. In January of last year the Commissioners of Irish Lights adopted one of the latter lights in a new lighthouse at Galley Head, near Kinsale. The maximum intensity of the four burners combined for thick weather was about 5012 candles.

The author next gave statements showing the comparative focussing compactness of the lighthouse luminaries which had been referred to for utilising in optical apparatus, viz., the lights produced by oil, coal gas, and electricity. The focussing superiority of the electric luminary, compared with the best of these, was as 616 to 1. Statements were given of the comparative average cost and annual maintenance of a single lighthouse (shore station) in this country with colza oil, mineral oil, coal gas, and electricity as the illuminating agents, both with and without a first-class twenty-horse power siren fog signal. For a maximum degree of light equal to the single or combined intensity of the luminaries of the Lizard, the cost of the more perfect electric luminary per unit of light provided was about thirteen-twenty-secondths and six-twenty-secondths respectively of that of coal gas, and about thirteen-sixty-fifths and six-sixty-fifths respectively of that of mineral oil, at their maximum intensities. With higher intensities of the electric luminary, the cost per unit would be more in its favour, no further addition to the working staff being necessary.

From Experiments by Faraday for the Trinity House, in 1836, relative to the penetrative power of lights through such obstructions as fog, mist, &c., and the more recent experiments by the French lighthouse authorities and by the Trinity House, with oil and electric lights, it might be assumed that, with the atmosphere so impaired for the transmission of light, that the oil luminary at its maximum intensity would be fairly visible at the fog signal range of two miles, the electric luminary at its double Lizard intensity of 16,500 candles would be visible at about four miles. Further, on more frequent occasions, when the oil luminary would be visible at about eight and a half miles, the electric light would be visible at the full range of seventeen miles.

THE MANUFACTURE OF LUBRICENE.

OUR able contemporary, the *Scientific American*, contains a series of articles headed "American Industries," and amongst them is one on the above important subject, which we now reproduce :—

One of the inevitable problems connected with the general introduction of machinery is that of proper lubrication ; this is second only to correctness of design and good workmanship in the machinery itself. Manufacturers and users of machinery well know how difficult it is to cope with this problem. It is perhaps simple enough to lubricate surfaces so that friction is minimised ; but there are other elements in the problem which are quite as important as this, among which we mention the matter of economy, the time consumed in applying the lubricant, and the effect of the lubricant on the surface to which it is applied.

These points, although apparently quite simple, are really complex, and have recently commanded a great deal of attention in the mechanical world ; so much, indeed, that it has been made the subject of the most delicate tests known in mechanics.

Oils for lubricating purposes are generally comprised in three classes, viz., vegetable oils, and mineral oils.

Among the vegetable oils, olive oil holds without dispute the first place ; it has the great advantage that it can be purified without the assistance of mineral acids, and thus attains a higher value, which cannot be approached by other oils of vegetable origin. Next to olive oil come the oils extracted from sesame, sometimes called "gingelly oil ;" from ground nuts, which to a certain extent can also be purified without acids. Colza and cotton-seed oils follow at a long distance ; they must needs be purified by acids, which free them from the pectic and azotic matters which they contain in considerable quantities.

Unfortunately, this necessary treatment with, say, sulphuric acid, while it bleaches the oil, also alters materially its composiposition, disposing it to easy decomposition. Besides, if the proper proportions of acid are not carefully employed, fatty acids are produced which, dissolving in the oil, are detrimental to its application as a lubricant.

The second class comprises the oils and greases derived from animal substances. They are used for the finest machinery, for which they are specially valuable, and where the quantity is so small that the price is no consideration. They must all be much refined, either to remove the free fatty acids which sometimes are present in comparatively very great amounts, or other animal matters which very often accompany them in solution, which, not being wanted, are impurities. To this class belong the lard and neat's-foot oils, pressed cold, and purified with salts of lead ; also, spermaceti and others. The lower qualities of these oils are sometimes used in place of vegetable oils, as not being more expensive, but their price is kept down by deficient rectification, and as thus they are apt to oxidise soon and to desiccate, they can never be used with any advantage for ordinary machinery.

Well purified animal oils are also applicacable to the lubrication of heavy machinery where the bearing surfaces are large and the weight great.

Mineral oils form the third class. They are not suitable for the heaviest class of machinery, on account of their want of cohesion, and general high degree of inflammability.

Olive oil thus stands first as a lubricant. It has of late been much displaced by mineral oils, on account of its price, but it is a question whether, all things considered, it is not cheaper in the end. Of course it must, like other vegetable oils, be purified, and is more valuable the better this has been done. These purifying processes deprive it not only of the fatty acid, but also of its odour ; but, as other vegetable oils are equally neutralised and bleached, these qualities can be no guide to its lubricating properties.

Crude vegetable oils contain, as a rule, from one to six per cent of impurities, which depreciate their efficiency, and which must be removed by the application of acids. The amount of acid left in the oil is of the highest importance, for it is this acid which attacks the lubricated surfaces and wears them away.

In 1877, the American Institute, by a series of exhaustive tests of various lubricants, conducted by Prof. R. H. Thurston, of the Stevens Institute of Technology, determined the qualities of a great number of lubricants, and as a final result, after several months of investigation, awarded the medal of superiority to Mr. R. J. Chard, of this city, for the product now widely known as lubricene, which is said to combine the desirable qualities of the lubricants above enumerated, while it is without their objectionable features.

Prior to this, in 1875 Mr. Chard received a silver medal from the American Institute, and he received a medal for his products at the Centennial.

In view of the great importance of this subject, and of the merits of this particular lubricant, we describe, as far as the manufacturer will permit, the process of making lubricene.

The works and office are located at 134, Maiden Lane, in New York. Here three principal grades of lubricants are made, which are known as lubricene, cylinder oil, and engine oil. The materials used in the manufacture of these lubricants are tested and properly compounded by sample in the laboratory. The ingredients, which are common well-known substances, consist of animal fats and oils, mineral and vegetable oils, caoutchouc, and an alkali.

The fat, after being carefully refined, is put in a melted state into the cauldron ; the oils, caoutchouc, and alkali are added ; the whole is then subjected to a rather high but well-regulated temperature for two hours, after which it is drawn off into into pans, and conveyed to the cooling-room. In the winter the natural temperature of the air will cool the compound with sufficient rapidity, but in warm weather the temperature is reduced by artificial means ; the tables upon which the pans rest being hollow, a current of cool water is permitted to flow through. When the compound attains the required temperature, it is conveyed to the packing-room, where it is removed from the pans and packed into cans or kegs, each package being weighed to insure a proper measurement of the lubricene.

The cans or pails for containing the lubricene are made in great numbers by approved machinery in the shop.

Cylinder oil, which is composed of mineral and animal oils and an alkali, is compounded in the cauldron in the middle ground at the top, and is drawn directly from the cauldron into barrels for shipment.

Engine oil is compounded in the larger cauldron. It consists of animal oil with the addition of a percentage of mineral oil. The secret of the success of these lubricants lies in the care exercised in their manufacture, and in the peculiar combination of materials, whereby homogeneity and smoothness are secured.

The engine oil is compounded with a view to the neutralisation of the fatty acids, which, in the case of oils and fats not treated in this manner, are freed by the action of steam and work havoc with the valves, valve seats, piston, and cylinder.

Besides economy in the lubricant itself, Mr. Chard claims a great saving in the matter of time, as, when these lubricants are applied with a peculiar cup of his own manufacture, the friction surfaces are continuously lubricated without waste and without the necessity of constant attention. We are informed that these lubricants have been adopted by some of the principal railroads in the country, and that it is growing in favour wherever it is introduced.

Mr. Edwin G. Grahn, of Indianapolis Ind., has devised an improved carriage curtain fastener which is simple, secure, and easily operated.

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The various efforts which have been made, and the numerous influences now at work to injure, if not destroy, Patent Rights; the inefficiency of the many well-intended, but ill-considered, Schemes of Patent Law Reform, which have from time to time been suggested, and the tendency of which has generally been to prejudice the Inventor without advantage to the Public; together with the proceedings so essentially involving the interests of Inventors which have already taken place in Parliament, as to the propriety of abolishing Patent Rights altogether, show the necessity of an immediate and active co-operation on the part of those interested in Inventions and in Patent Property, and that an Association for the Protection and Defence of Patent Rights urgently needed. This Institute has, therefore, been established for the purpose of uniting and organising the influence of Inventors, Patentees, and others. Its objects are:—

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This Association was established in the year 1867, for the purpose of simplifying, cheapening, and expediting as far as possible the proceedings attending THE OBTAINING OF PATENTS FOR INVENTIONS and their commercial development.

Several leading members of the Inventors' Institute, coming daily in contact with Inventors, whose wants and difficulties were daily pressed on their attention, formed themselves into this Association, entitled "The Inventors' Patentright Association, Limited," in order to supply Inventors with the best and most reliable information and advice—to provide skilled references on questions of science and manufacture—to render legal processes for protecting and maintaining patent rights safe, cheap, and ready—and to aid Inventors in bringing their inventions into practicable and profitable shape. To carry out these views, the following are the

OBJECTS OF THE ASSOCIATION.

To obtain Patents for Inventions in this and other countries.
To Register Designs.
To aid in forming public Companies, and in Publicly introducing Patented Inventions.
To aid in Selling and Licensing Patented Inventions.
To furnish advice and professional Assistance in developing Inventions.
To collect Evidence, arrange Arbitrations, and otherwise assist Inventors in maintaining their rights.

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